COMPENDIUM OF
INDIAN MEDICINAL PLANTS

VOLUME 2
1970 - 1979

Ram P. Rastogi
B.N. Mehrotra

Central Drug Research Institute, Lucknow
and
Publications & Information Directorate, New Delhi
1993

DRUG RESEARCH PERSPECTIVES : A CDRI SERIES

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COMPENDIUM OF INDIAN MEDICINAL PLANTS VOLUME 2 1970 - 1979

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EXPLANATORY INTRODUCTION

SCOPE

This compendium has been designed as a companion volume to Glossary of Indian Medicinal Plants by Chopra, Nayar & Chopra (hereinafter referred to as Glossary). All the plants have been listed in alphabetical order and reference to the Glossary has been given for those plants which are included therein; in the case of new plants, not listed in the Glossary, their local names and distribution have also been included, wherever known, in keeping with the pattern of the Glossary. The distributional range of such plants has been confined to the present political boundary of India. Bhutan and Nepal have also been included because these countries fall within the unbroken chain of the Himalayas and some of the Himalayan species occur in contiguous territories in India, Bhutan and Nepal. Certain plants, although not found in india, are included either because these were listed in the Glossary or are sold in indigenous drug market in India.

The literature cited is on the basis of complete screening of Chemical Abstracts and Biological Abstracts and covers the ten- year period from 1970 to 1979. It has been aimed to make the compendium exhaustive by including research done anywhere in the world on the taxa foud in India, whether indigenous or introduced.

LITERATURE CITATION

The abbreviations of the reference citations are in accordance with the practice followed in Chemical Abstracts andSerial Sources for the Biosis Data Base, Volume 1985. Since many journals, especially those published in Latin American, African and South-east Asian countries, are not available in most Indian libraries and some journals have stopped publication or have changed their names, cross reference to Chemical Abstracts have been given in such cases.

BOTANICAL NOMENCLATURE

Since the nomenclatures of many plants have undergone revision in the preceding decades, the names of plants, including those given in the Glossary and in the cited references, have been updated as far as possible to provide currently accepted names. In cases of change of name, the obsolete names have been given as synonyms according to the following order: the

currently accepted name is followed by the name given in the Glossary and then by the corresponding name listed in Hooker's Flora of British India or other subsequent relevant literature as addition to Indian flora (if it is different from the name listed in the Glossary), and finally by the title name of the plant given in the reference cited, if it is different from the earlier mentioned names. Similarly, the names of the natural orders (families) have also been revised wherever required according to the currently accepted pattern.

There is divergence of opinion among Indian botanists on the merits of maintaining or splitting of a few large genera like Bauhinia, Euphorbia and Polygonum. In order to decide their proper status, detailed taxonomic investigations of the species are required. In this compendium, therefore, their existing generic status has been maintained.

The Plant names mentioned under synonymy, in case of name change, have been inserted in their alphabetical order and cross references to their currently accepted names have been given to facilitate search for any particular plant on which information may be required.

STRUCTURES

Structure of some substances have been revised and in many cases absolute stereostructures have been determined in the post-1979 years. To provide complete information to the readers and also to avoid duplication in the third volume (1980 to 1989), an attempt has been made to present current structures with the relevant post-1979 references, wherever applicable.

INDEXES

Besides indexes of local names and chemical substances isolated, an additional index of biological activities has also been provided to enhance the usefulness of the compendium to all classes of readers.

In the index of chemical compounds, trivial names are used, wherever given, and no attempt has been made to include systematic names. Synonyms, as far as they have come to our knowledge, have been included in the index via "see". Substances unnamed by their discoverers have been listed simply by plant origin, e.g. 'Bombax anthocyanin A'. Since the list contained about 5300 entries, help of computer has been taken to prepare an alphabetised list. A suitable computer programme has been developed for this purpose. Thus, the name of the compound is arbitrarily divided into 3 components - the basic name, prefixes such as d,l, cis,trans, α,β etc. and substituents. Each substance has been indexed as far as possible under its basic name. Example : d-α-cadinene is indexed as cadinene, d-alpha-; O-demethyl-β-lumicolchicine as lumicolchicine, beta-, O-demethyl; 2-methyl-5-methoxy-1,4-naphthoquinone as naphthoquinone, 1,4-,2-methyl-5-methoxy.

SPECIAL FEATURES

In view of the fact that since 1960 research on plants, both from the chemical and biological aspects, has been much more exhaustive than earlier, the pattern of the write-up

on each plant has been suitably modified to include the new type of data/information. Besides summarising the results of biological evaluation of total extracts and fractions thereof and of chemical studies, each write-up has two new sections wherever necessary. A section on 'Biological Activity' gives a summary of all the pharmacological, biological and clinical work done on the pure constituents obtained from a plant and a section on 'New Compounds' gives the complete structures of any new substances isolated. It is hoped that these two new sections would add immensely to the usefulness of the compendium by highlighting the results of chemical and biological studies on each plant in a systematic manner.

Central Drug Research Institute
Lucknow
April, 1991

Ram P. Rastogi
B. N. Mehrotra

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The editor would like to take this opportunity to express his gratitude to the Director-General, Council of Scientific and Industrial Research, New Delhi, for sanctioning the project under which this compendium has been compiled and to Dr. M.M.Dhar, the ex-Director and Dr. B.N. Dhawan, the present Director of the Central Drug Research Institute, Lucknow, for providing all the necessary infrastructural, library and computer facilities.

Thanks are due to Dr. S. Bhattacharji, ex-Dy. Director and now Consultant at CDRI, Lucknow, for his invaluable help in correction of the manuscript and to Dr. R.K. Sharma and Mr. A. Jamal for developing a computer programme for preparation of the index of chemical constituents. I also thank the staff of the project - Mr. R.C. Dwivedi, Mr. D.N. Vishwakarma and Miss Mary Ambika V.L. for typing the manuscript and generally assisting in making it ready for the press.

The first volume of this compendium which was published last year, has been well received. I would particularly like to acknowledge the personal interest and support of Dr. B. N. Dhawan towards the publication of these volumes. I am thankful to Dr. G.P. Phondke, Director, Publication & Information Directorate, CSIR, New Delhi, for help in expeditious publication of these volumes.

Ram P. Rastogi

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ABELMOSCHUS (Malvaceae)

A. moschatus Medik, syn. *Hibiscus abelmoschus* L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p.1).

β-Sitosterol and its β-D-glucoside, myricetin and its glucoside obtained from leaves and petals; dry fruit husk yielded only β-sitosterol (*Acta Phytother.* 1971, *18*, 134; *Chem. Abstr.* 1972, *76*, 12000 g).

ABIES (Pinaceae)

A. excelsa DC.; see *Picea abies* (L.) Karst.

ABROMA (Sterculiaceae)

A. augusta (L.) L.f. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 1).

Root extract showed significant abortifacient activity in mice; anti-implantation effect was also observed (*Indian J. Med. Res.* 1975, *63*, 378).

Taraxeryl acetate, taraxerol and β-sitosterol isolated from leaves (*J. Indian Chem. Soc.* 1969, *66*, 849); choline, betaine, an unidentified alkaloid, β-sitosterol and stigmasterol from roots (*Experientia* 1970, *26*, 477); β-sitosterol and friedelin isolated (*J. Indian Chem. Soc.* 1977, *54*, 647); octacosane-1,28-diol from heartwood (*Curr. Sci.* 1978, *47*, 301).

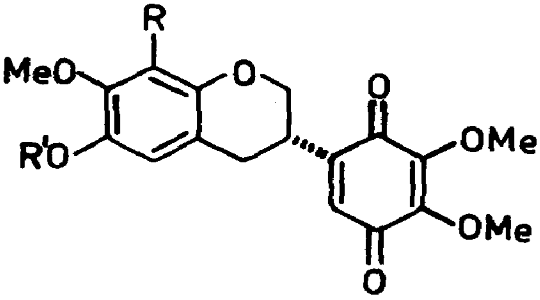
ABRUS (Papilionaceae)

A. precatorius L. (*Compend. Indian Med. Plants,* Vol 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 1).

Alcoholic extract of seeds showed parasympathomimetic effect on smooth muscle of guinea pig and rabbit and skeletal muscle of frog (*J. Res. Indian Med.* 1971, *6*, 139); aqueous extract showed anthelmintic activity which was absent in extract prepared by boiling seeds in water (*J. Res. Indian Med.* 1975, *10*, 138).

Abrine, hypaphorine, choline, trigonelline, precatorine and methyl ester of N,N-dimethyltryptophan metho cation isolated from seeds (*Phytochemistry* 1971, *10*, 195); alcoholic extract of seeds showed presence of carbohydrates and amino acids whereas ammonium oxalate extract showed presence of sugars (*Pakistan J. Sci. Ind. Res.* 1971, *14*, 350; *Chem. Abstr.* 1972, *77*, 85682 m); 5β-cholanic acid isolated from seeds (*Steroids* 1974, *23*, 357); two toxic antitumor proteins - abrin A and abrin B - isolated from seeds (*Int. J. Pept. Protein Res.* 1978, *12*, 311; *Chem. Abstr.* 1979, *90*, 145711 a); three new isoflavan—quinones I, II and III isolated from roots and characterised (*Gazz. Chim. Ital.* 1979, *109*, 9; *Chem. Abstr.* 1979, *91*, 157554 k).

NEW COMPOUNDS



I
R = H, R′ = Me
II
R = OMe, R′ = Me
III
R = OMe, R′ = H

BIOLOGICAL ACTIVITY

LD of abrin A and abrin B in mice found to be 10 and 25 μg/kg respectively. Abrin A at 0.8 μg/ml agglutinated human O-type erythrocytes whereas abrin B showed no such activity; abrin A and abrin B agglutinated both sarcoma 180 and Ehrlich ascites tumor cells at 5 and 150 μg/ml respectively. At sublethal dose both these proteins inhibited growth of Ehrlich ascites tumor cells (*Int. J. Pept. Protein Res.* 1978, *12*, 311; *Chem. Abstr.* 1979, *90*, 145711 a).

ABUTILON (Malvaceae)

A. indicum G. Don; see *A. indicum* (L.) Sw.

A. indicum (L.) Sw. syn. *A. indicum* G. Don (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 2).

Gossypetin-8 and 7-glucosides and cyanidin-3-rutinoside isolated (*Phytochemistry* 1972, *11*, 1518).

ACACIA (Mimosaceae)

A. arabica Willd.; see *A. nilotica* (L.) Willd. ex Delile ssp. *indica* (Benth.) Brenan

A. caesia W. & A. (non Willd.); see *A. torta* (Roxb.) Craib.

A. catechu (L.f.) Willd. (*Glossary Indian Med. Plants*, Chopra Nayar & Chopra, PID, New Delhi, 1956,p. 2).

Seeds exhibited marked hypoglycaemic activity in normal rats but not in alloxan-diabetic rats (*Indian J. Med. Res.* 1976, *64*, 754).

A. concinna DC.; see *A. rugata* (Lamk.) Merr.

A. farnesiana (L.) Willd. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 2.)

Isorhamnetin-3,7-glucorhamnoside obtained from flowers (*J. Indian Chem. Soc.* 1970, *47*, 183); gallic acid, ellagic acid, m-digallic acid, methyl gallate, kaempferol, **aromadendrin**, naringenin, kaempferol-7-diglucoside, naringenin-7-glucoside and a new glycoside, probably naringenin-7-diglucoside acylated with gallic acid, isolated (*Phytochemistry* 1973, *12*. 2303); pods yielded a new acylglucoside characterised as naringenin-7-O-β-D-(6''-O-galloyl)glucopyranoside (prunin-O-6''-gallate) (*Phytochemistry* 1974, *13*, 2843); rutin and apigenin-6,8-bis-C-glucopyranoside (0.4%) from leaves (*Pharmazie* 1974, *29*, 352; *Chem. Abstr.* 1975, *82*, 28474 a); an unidentified cyanogenic glucoside isolated (*Phytochemistry* 1976, *15*, 1703).

A. intsia W. & A.; see *A. torta* (Roxb.) Craib.

A. intsia Willd.; see *A. torta* (Roxb.) Craib.

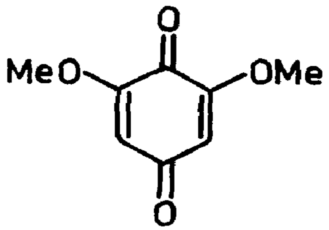
A. leucophloea (Roxb.) Willd. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 2).

Stem bark yielded n-hexacosanol, β-amyrin and β-sitosterol whereas heartwood yielded only the first two compounds (*J. Indian Chem. Soc.* 1977, *54*, 649).

A. melanoxylon R. Br. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p.3).

Isolation and structure of a new contact allergen - 2,6-dimethoxy-1,4-benzoquinone (I) (*Naturwiss.* 1977, *64*, 534; *Chem. Abstr.* 1978, *88*, 3079 k).

NEW COMPOUNDS



I

A. modesta Wall. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 2).

Seeds showed hypoglycaemic activity in normal rats, but no significant effect in alloxan-diabetic rats (*Indian J. Physiol. Pharmacol.* 1975 *19*, 167).

A. mollissima Willd. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 3).

(-)Trans-4-hydroxypipecolic acid from young leaves (*Yakugaku Zasshi* 1969, *89*, 1723; *Chem. Abstr.* 1970, *72*, 136340 e).

A. nilotica (L.) Delile ssp. *adonsonii* (Gill. & Perr.) Brenan; see *A. nilotica* (L.) Delile ssp. *astringens* (Schum.-Thonn.) Roberty

A. nilotica (L.) Delile ssp. *astringens* (Schum. & Thonn) Roberty syn. *A. nilotica* (L.) Delile ssp. *adonsonii* (Gill. & Perr.) Brenan

H. - Kikar; B. - Babla, Babul; Bo. - Babhula, Kikar; S. - Babbula; Tam. - Karu velum; Tel. - Nallatumma.

Gallic acid, protocatechuic acid and leucocyanidin isolated from pods (*Leather Sci.* 1977, *24*, 293; *Chem. Abstr.* 1978, *89*, 87172 s).

Distribution : Maharashtra.

A. nilotica (L.) Willd. ex Delile ssp. *indica* (Benth.) Brenan syn. *A. arabica* auct. (non Willd.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 3).

Seeds exhibited hypoglycaemic effect in normal rats but were ineffective in alloxan-diabetic rats (*Indian J. Physiol. Pharmacol.* 1975, *19*, 167).

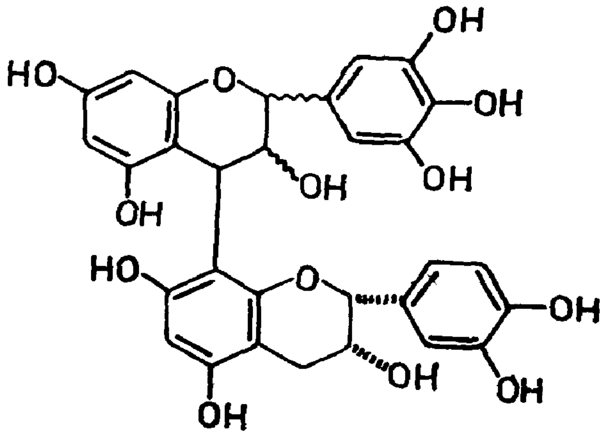
Polyphenolic phlobaphenes consisting mainly of catechol and pyrogallol from bark (*Egypt. J. Chem.* 1974, *17*, 699; *Chem. Abstr.* 1977, *86*, 167855 v); stearic acid, kaempferol-3-glucoside, isoquercitrin, leucocyanidin and an unidentified phenolic compound from flowers (*Vijnana Parishad Anusandhan Patrika* 1975, *18*, 41; *Chem. Abstr.* 1976, *84*, 40784 z).

A. polycantha Willd. ssp. *polycantha* Brenan syn. *A. suma* (Roxb.) Kurz (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 3).

Seeds showed marked hypoglycaemic activity in normal rats but not in alloxan-diabetic rats (*Indian J. Med. Res.* 1976, *74*, 754).

A new proanthocyanidin (I) from stem bark (*Experientia* 1977, *33*, 1272).

NEW COMPOUNDS

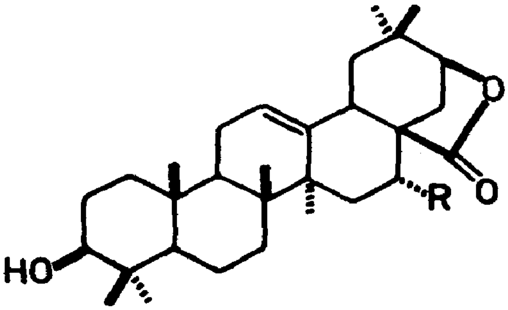


I

A. rugata (Lamk.) Merr. syn. *A. concinna* DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 2).

Tartaric, oxalic, succinic and ascorbic acids along with alkaloids - calycotomine and nicotine - from leaves (*Planta Med.* 1971, *19*, 55); saponin isolated from seeds was mixture of acacinin A, acacinin B and concinnin; acacinin A comprised of acacic acid and carbohydrate moiety consisting of glucose, arabinose, xylose, fucose and rhamnose in molar ratio 3:1:3:2:2 (*J. Indian Chem. Soc.* 1973, *50*, 544; *Indian J. Chem.* 1976, *14*B, 228); acacinins C,D and E, sucrose, raffinose, stachyose and verbascose isolated from pods; acacinin D consisted of acacic acid and glucose, arabinose, xylose, fucose, rhamnose and an unidentified sugar in molar ratio 2:1:3:2:3:2 (*J. Indian Chem. Soc.* 1976, *53*, 153); isolation of acacic acid and a new glycoside - sonuside - which yielded on hydrolysis acacinin E and glucose (*Curr. Sci.* 1977, *46*, 382); acacic acid lactone, machaerinic acid and its lactone, sapogenin B and a new ester of acacic acid from pods (*Indian J. Chem.* 1977, *15*B, 1); 3β-OH in structure of acacic acid revised to 3α-OH (*Trans. Bose Res. Inst.* Calcutta 1976, *39*, 61; *Chem. Abstr.* 1977, *87*, 53460 c).

NEW COMPOUNDS



Sapogenin B
R = H
Acacic acid lactone
R = OH

A. suma (Roxb.) Kurz; see *A. polycantha* Willd. ssp. *polycantha* Brenan

A. torta (Roxb.) Craib. syn. *A. caesia* W. & A. (non Willd.), *A. intsia* W. & A., *A. intsia* Willd. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 4).

Acacic and machaerinic acids isolated from acid hydrolysate of plant extract (*Curr. Sci.* 1972, *41*, 600).

ACALYPHA (Euphorbiaceae)

A. indica L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 4).

Aqueous extract was given to 38 patients having cardinal symptoms of wheezing cough; 18% cases showed good clinical response from all symptoms, 22% showed no improvement

while 60% were relieved of wheezing within two weeks. The raised eosinophil count also came down to normal level (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 81).

ACANTHOPANAX (Araliaceae)

A. aculeatum (Ait.) Seem; see *Eleutherococcus trifoliatus* (L.) Hu

A. trifoliatus (L.) Merr.; see *Eleutherococcus trifoliatus* (L.) Hu

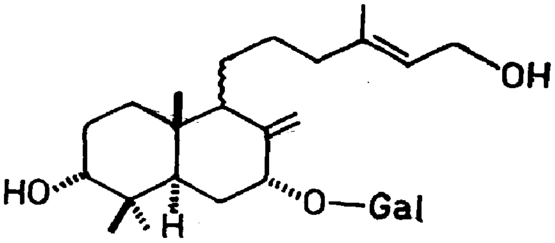
ACANTHOSPERMUM (Asteraceae)

A. hispidum DC.

Isolation and identification of a new diterpene glycoside - acanthospermol-β-galactosidopyranoside (*Phytochemistry* 1976, *15*, 1776).

Distribution : Native of South America, naturalised in tropical regions of India.

NEW COMPOUNDS



Acanthospermol-β-galactoside

ACER (Aceraceae)

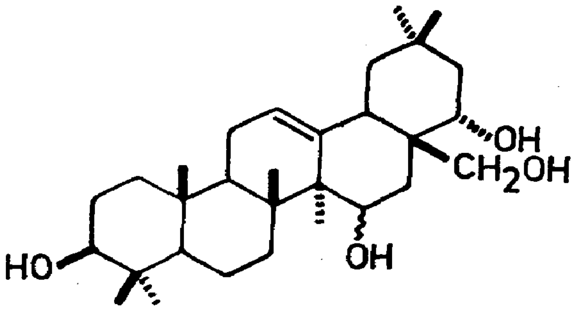
A. caesium Wall. ex Brandis

H. - Kainju, Kanjula, Kilu, Kinar; P. - Trekhan, Mandar.

Isolation and structure of acergenin from heartwood (*Curr. Sci.* 1973, *42*, 642).

Distribution : Himalayas, Kashmir to Nepal, alt. 1800-3000 m.

NEW COMPOUNDS



Acergenin

A. pentapomicum J. L. Stewart ex Brandis

H. - Kilpattar.

Isolation of gallic acid and its methyl and ethyl esters from leaves (*Pakistan J. Sci. Ind. Res.* 1975, *18*, 91; *Chem. Abstr.* 1977, *86*, 40184 y).

Distribution : North-west Himalayas from Kashmir to Kumaon in dry localities, alt. 600-1600 m.

ACHILLEA (Asteraceae)

A. lanulosa Nutt.; see *A. millefolium* L.

A. millefolium L. syn. *A. lanulosa* Nutt. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 4).

Three lactones - compound, mp. 188°, millefin and deacetylmatricarine - isolated (*Khim. Prir. Soedin.* 1972, *8*, 246; *Chem. Abstr.* 1972, *77*, 85556 y); rutin from leaves (*Khim. Prir. Soedin.* 1972, *8*, 676; *Chem. Abstr.* 1973, *78*, 94818 h); apigenin, luteolin, cosmosiin and luteolin-7-O-β-D-glucopyranoside isolated (*Khim. Prir. Soedin.* 1973, *9*, 273; *Chem. Abstr.* 1973, *79*, 40007 v); three new flavones - 5-hydroxy-3,6,7,4'-tetramethoxyflavone (I), artemetin and casticin - isolated and characterised (*J. Pharm. Sci.* 1975, *64*, 1838); three new amides (II,III and IV) isolated and their structures elucidated (*Chem. Ber.* 1974, *107*, 1038); inflorescence essential oil (0.09-0.45%) from Romanian plant contained azulene (9.53), terpineol, bornyl acetate and 1,8-cineole (*Clujul Med.* 1977, *50*, 78; *Chem. Abstr.* 1977, *87*, 172694 s).

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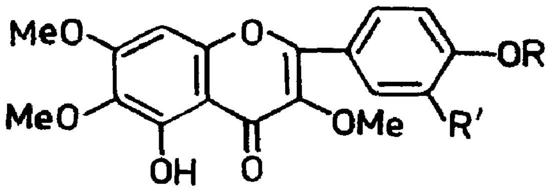


I

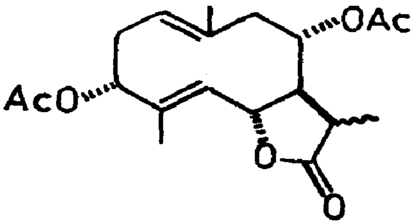
R = Me, R' = H

Artemetin

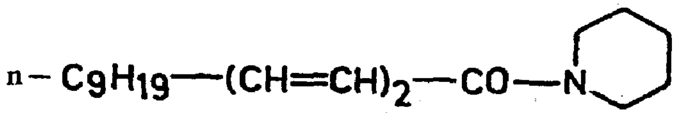
R = Me, R' = OMe

Casticin

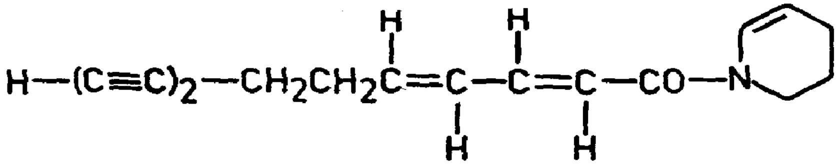
R = H,H , R' = OH



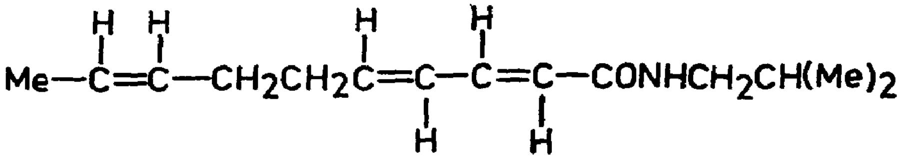
Millefin



II



III



IV

BIOLOGICAL ACTIVITY

Achillin showed direct depressant effect on amphibian heart and spasmolytic activity on gut muscle. It also possessed hypothermic activity (*Indian J. Med. Sci.* 1974, *28*, 331).

ACHRAS (Sapotaceae)

A. zapota L. (*sapota*) ; see *Manilkara zapota* (L.) P. van Royen

ACHYRANTHES (Amaranthaceae)

A. aspera L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 5).

Seeds used as emetic and in treatment of hydrophobia (*Phytochemistry* 1973, *12*, 214); stem bark extract showed significant abortifacient activity in mice (*Indian J. Med. Res.* 1975, *63*, 378).

Ecdysterone (polypodine A) from roots (*Phytochemistry* 1970, *9*, 1671; *ibid.* 1971, *10*, 2225); two oleanolic acid based saponins from fruits and ecdysone from roots (*Phytochemistry* 1973, *12*, 214).

BIOLOGICAL ACTIVITY

Mixture of seed saponins increased force of contraction of isolated guinea pig and rabbit heart and this effect at lower doses (1-50 μg) was blocked by pronethalol. Saponins also increased tone of hypodynamic heart and force of contraction of failing papillary muscle (*Indian J. Med. Res.* 1972, *60*, 462).

ACONITUM (Ranunculaceae)

A. bisma (Buch. - Ham.) Rap. syn. *A. palmatum* D. Don (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 6).

Crystal structure of vakognavine, isolated from root tubers (*Indian J. Chem.* 1974, *12*, 1219).

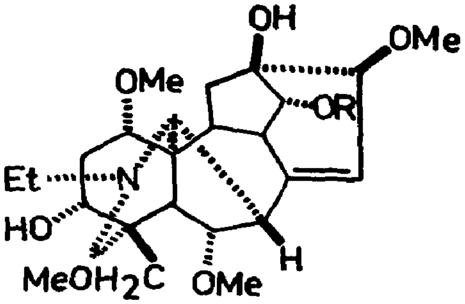
A. chasmanthum Holmes ex Stapf (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 6).

Isolation and structure of chasmanine (*Chem. Commun.* 1976, 253).

A. falconeri Stapf (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 7).

Two novel diterpenoid alkaloids - falaconitine and mithaconitine - isolated from roots together with pseudaconitine, indaconitine and veratroylpseudaconitine and their structures elucidated (*Chem. Commun.* 1977, 12; *Phytochemistry* 1977, *16*, 623).

NEW COMPOUNDS



Falaconitine
R = COC_6H_3(3,4-di-OMe)
Mithaconitine
R = Bz

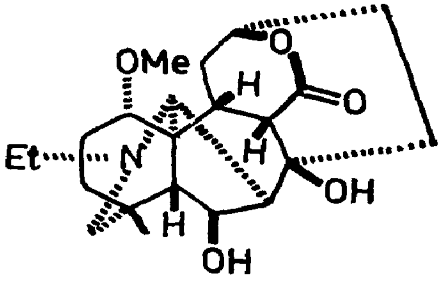
A. ferox Wall. ex Ser. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 4).

Bikhaconitine, chasmaconitine, indaconitine and pseudaconitine isolated (*Lloydia* 1972, *35*, 55).

A. heterophyllum Wall. ex Royle (*Compend. Indian Med. Plants*. Vol. 1, Rastogi & Mehrotra PID, New Delhi, 1990, p. 7).

Stereostructure of heteratisine established (*Tetrahedron* 1973, *29*, 3297).

NEW COMPOUNDS



Heteratisine

A. palmatum D. Don; see *A. bisma* (Buch.-Ham.) Rap.

A. soongaricum Stapf. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990 p. 8).

BIOLOGICAL ACTIVITY

Aconitine had action on the CNS, CVS and respiratory system due to presence of benzyl ester and hydroxy groups in the molecular structure. Acetylation of hydroxyls or saponification of benzyl ester led to sharp decrease in toxicity and arrhythmic activity. Aconitine (10 μg, i.v.) produced cardiac arrhythmia in cats which was abolished by i.v. reserpinisation, indicating involvement of central adrenergic mechanism in induction of cardiac arrhythmia (*Indian J. Physiol. Pharmacol.* 1975, *19*, 1).

Songorine exhibited psychostimulant and antidepressant properties (*Farmakol. Rastit. Veshchestv* 1976, 76; *Chem. Abstr.* 1978, *89*, 140208 m); songorine at 5-100 mg/kg, i.v. or i.p. dose showed significant psychotropic effects but its peripheral M- and N-cholinolytic and adrenosensitising effects were weak. At low doses it stimulated and at high doses it inhibited the function of CNS (*Farmakol. Alkaloidov Ikh. Proizvod.* 1972, 146; *Chem. Abstr.* 1974, *80*, 91209 r).

A. violaceum Jacq. ex Stapf (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 5).

Indaconitine isolated (*Phytochemistry* 1971, *10*, 3320); glucose, rhamnose and bikhaconitine isolated (*J. Indian Chem. Soc.* 1977, *54*, 924).

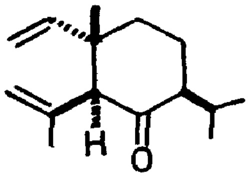
ACORUS (Araceae)

A. calamus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 8).

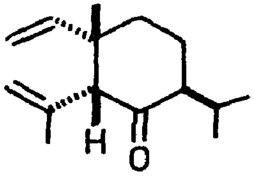
A new sesquiterpene diol - isocalamendiol - isolated from essential oil from Japanese plant rhizomes and its structure elucidated; three monocyclic sesquiterpenes - shyobunone, epishyobunone and isoshyobunone - and also calamendiol isolated (*Tetrahedron Lett.* 1969, 3729); a plausible precursor of isocalamendiol - preisocalamendiol - isolated (*Tetrahedron Lett.* 1970, 855); synthesis of shyobunone and preisocalamendiol (*Chem. Commun.* 1970, 1324); structure of calamendiol revised and structures of shyobunone, epishyobunone, isoshyobunone, isocalamendiol and calamendiol established (*Tetrahedron* 1971, *27*, 5419); two new selinane type sesquiterpenes - acolamone and isoacolamone - isolated from rhizomes (*Chem. Lett.* 1972, 823; *Chem. Abstr.* 1972, *77*, 137400 q); structures of acolamone, isoacolamone and a new sesquiterpene - acoragermacrone - established (*Tetrahedron Lett.* 1973, 2759; *Bull. Chem. Soc. Jpn.* 1975, *48*, 2930); a flavone diglycoside isolated and identified as luteolin-6,8-C-diglucoside (*Khim. Prir. Soedin.* 1974, *10*, 94; *Chem. Abstr.* 1974, *80*, 121271 z); absolute configuration of epi- and isoshyobunone established (*Chem. Lett.* 1977, 1415; *Chem. Abstr.* 1978, *88*, 105587 s); new sesquiterpenes - (+)calamusenone and isocalamusenone - and a new tropone (I) isolated and their structures elucidated

(*Phytochemi..try* 1979, *18*, 279); structure of new sesquiterpenic hydrocarbon - (-)cadala-1,4,9-triene (*Phytochemistry* 1979, *18*, 328).

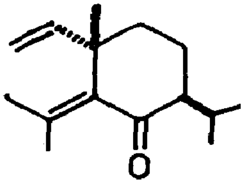
NEW COMPOUNDS



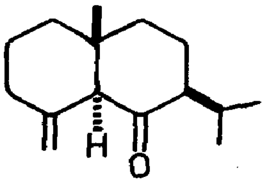
Shyobunone



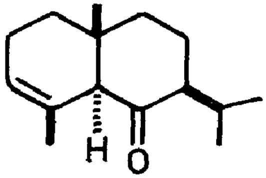
Epishyobunone



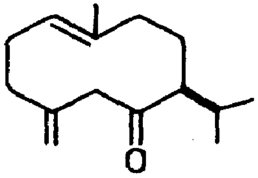
Isoshyobunone



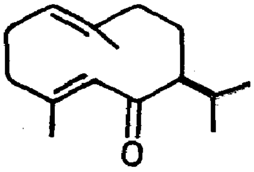
Acolamone



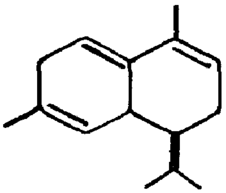
Isoacolamone



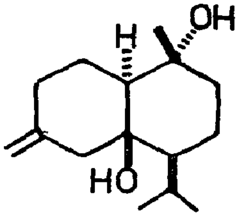
Preisocalamendiol



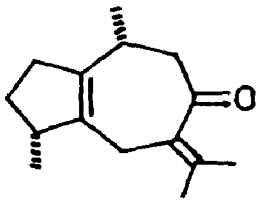
Acoragermacrone



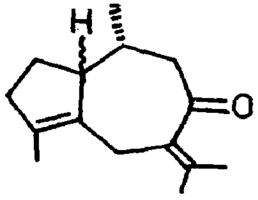
Cadala-1,4,9-triene



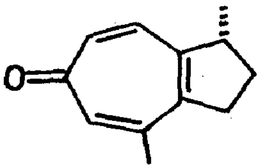
Isocalamendiol



Calamusenone



Isocalamusenone



I

ACRONYCHIA (Rutaceae)

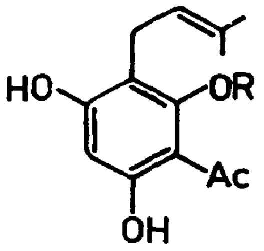
A. laurifolia Blume; see *A. pedunculata* (L.) Miq.

A. pedunculata (L.) Miq. syn. *A. laurifolia* Blume (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p.6).

Quaternary alkaloid fraction showed activity similar to that of known tranquillising agents (*Indian J. Physiol. Pharmacol.* 1976, *20*, 250).

Isolation and structure of new phenolic compound - acronylin - from bark (*Chem. Ind.* 1970, 654); 6-demethylacronylin isolated (*Indian J. Chem.* 1973, *11*, 693).

NEW COMPOUNDS



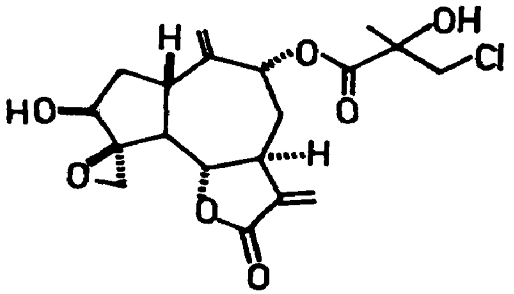
Acronylin
R = Me
6-Demethylacronylin
R = H

ACROPTILON (Asteraceae)

A. repens (L.) DC. syn. *Centaurea picris* Pall. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 58).

Isolation and structure of new sesquiterpene lactone - acroptilin (*Khim. Prir. Soedin.* 1973, *9*, 161; *Chem. Abstr.* 1973, *79*, 5466 x).

NEW COMPOUNDS



Acroptilin

ACTINIOPTERIS (Polypodiaceae)

A. dichotoma Bedd. syn. *A. radiata* (Swartz) Link (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p.6).

Hentriacontane, hentriacontanol, β-sitosterol, its palmitate and its glucoside, an unidentified glucoside, glucose and fructose from aerial parts (*Curr. Sci.* 1974, *43*, 749).

A. radiata (Swartz) Link; see *A. dichotoma* Bedd.

ACTINODAPHNE (Lauraceae)

A. angustifolia Nees

Mar. - Pishia; Assam - Dhupati, Nabhar.

β-Sitosterol, quercetin-3-rhamnoside, vitexin and friedelin isolated (*Phytochemistry* 1971, *10*, 2247).

Distribution : Assam, Meghalaya and Western Ghats, ascending to 800 m in the hills.

A. obovata (Nees) Blume

Assam - Banji; Khasi - Diend-lakroo.

Aporphine alkaloids - laurotetanine, N-methyllaurotetanine and actinodaphnine - isolated (*Phytochemistry* 1972, *11*, 3057).

Distribution : Sikkim, Assam, Meghalaya and Manipur, ascending to 1000 m.

ADENANTHERA (Mimosaceae)

A. pavonina L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p.6).

Flavonoid compounds - robinetin, chalcone, butein, amelopsin and dihydrorobinetin - isolated (*Phytochemistry* 1972, *11*, 1515); stigmasterol glucoside, dulcitol, a polysaccharide and stigmasterol from seeds; octacosanol, dulcitol, β-sitosterol glucoside and stigmasterol from leaves (*Planta Med.* 1973, *23*, 145).

ADENIUM (Apocynaceae)

A. obesum Roem. & Schult.

Ethanolic extract exhibited cytotoxic activity against human epidermoid carcinoma of nasopharynx (*J. Pharm. Sci.* 1977, *66*, 1336).

Cardenolides - somalin, hongheloside A, 16-acetylstrospeside and honghelin; flavonols - 3,3′-O-dimethylquercetin and 3-O-methylkaempferol - along with triterpene - dihydroifflaionic acid - isolated (*J. Pharm. Sci.* 1977, *66*, 1336).

Distribution : Introduced into India, grown in gardens in Deccan Peninsula.

ADENOSMA (Scrophulariaceae)

A. capitatum (Benth.) Hance; see *A. indianum* (Lour.) Merr.

A. indianum (Lour.) Merr. syn. *A. capitatum* (Benth.) Hance

Essential oil contained fenchone (33.5), l-limonene (22.6), cineole (5.9%), ($\pm$)α-humulene, fenchone and piperitenone oxide (*Tap Chi Hoa Hoc* 1977, *15*, 25; *Chem. Abstr.* 1978, *88*, 141479 s).

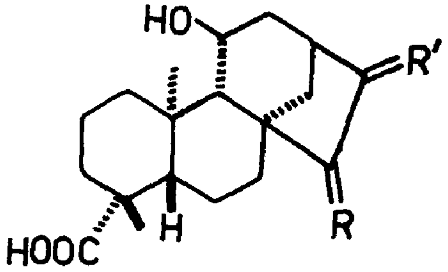
Distribution : Outer lower Himalayas from Kumaon to Sikkim, Bengal and Assam.

ADENOSTEMMA (Asteraceae)

A. lavenia (L.) O. Kuntze syn. *A. viscosum* Forst. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 6).

Four 11-hydroxylated kauranic acids - ent-11α-hydroxy-15α--acetoxykaur-16-en-19-oic acid (I), ent-11α,15α-dihydroxykaur-16-en-19-oic acid (II), (16R)-ent-11α-hydroxy-15-oxokauran-19-oic acid (III) and ent-11α-hydroxy-15-oxokaur-16-en-19-oic acid (IV) - were isolated (*J. Nat. Prod.* 1979, *42*, 183).

NEW COMPOUNDS



I

R = OAc,H, R' = CH_2

II

R = OH,H, R' = CH_2

III

R = O, R' = β-Me,H

IV

R = O, R' = CH_2

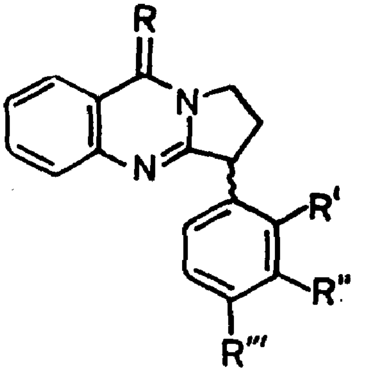
ADHATODA (Acanthaceae)

A. vasica Nees; see *A. zeylanica* Medik.

A. zeylanica Medik. syn. *A. vasica* Nees (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 10)

Four new quinazoline alkaloids - vasicoline, adhatodine, vasicolinone and anisotine - were isolated (*Helv. Chim. Acta* 1971, *54*, 826); vasicinone from inflorescence (*Naturwiss.* 1979, *66*, 205; *Chem. Abstr.* 1979, *90*, 200351 k).

NEW COMPOUNDS



Adhatodine
R = H,H, R′ = H, R″ = COOMe, R‴ = NHMe
Anisotine
R = O, R′ = H, R″ = COOMe, R‴ = NHMe
Vasicoline
R = H,H, R′ = NMe_2, R″,R‴ = H
Vasicolinone
R = O, R′ = NMe_2, R″,R‴ = H

BIOLOGICAL ACTIVITY

Uterotonic activity of vasicine in different species of animals *in vivo* was similar to that of oxytocin and methylergometrine. The effect was influenced by the degree of priming of uterus by estrogens and was markedly decreased after pretreatment of uterus with aspirin and indomethacin (*Indian J. Med. Res.* 1977, *66*, 865).

Vasicine showed bronchodilatory activity both *in vitro* and *in vivo* comparable with that of theophylline. Vasicinone showed bronchodilation *in vitro* and bronchoconstriction *in vivo.* Both in combination had more bronchodilatory activity *in vitro* and *in vivo.* Vasicine also exhibited respiratory and uterine stimulant activity and moderate hypotensive activity (*Indian J. Med. Res.* 1977, *66*, 680); Vasicine showed abortifacient effect in guinea pigs depending on the stage of pregnancy and prior priming of animals with estradiol. In rats, it did not show any abortifacient effect (*Indian J. Exp. Biol.* 1978, *16*, 1075).

ADIANTUM (Adiantaceae)

A. caudatum L. (*Glossary Indian Med. Plants*, Chopra, Navar & Chopra, PID, New Delhi, 1956, p. 7).

16-Hentriacontanone, hentriacontane, adiantone, isoadiantone and β-sitosterol isolated (*Indian J. Pharm.* 1975, *37*, 64); triterpenes - fernene, adiantone and isoadiantone - isolated (*Curr. Sci.* 1978, *47*, 624).

ADONIS (Ranunculaceae)

A. aestivalis L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 7).

Cymarin from stems and leaves (*Lloydia* 1973, *36*, 426); sitosterol and ceryl alcohol from roots (*Indian J. Chem*. 1976, *14*, 475).

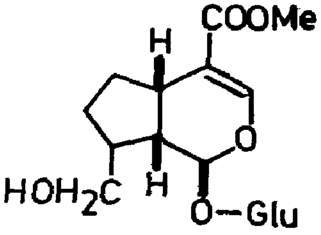
ADOXA (Caprifoliaceae)

A. moschatellina L.

Secologanin, morroniside and a new iridoid glucoside - adoxoside - isolated from whole plant (*Biochem. Syst. Ecol.* 1979, *7*, 103; *Chem. Abstr.* 1979, *91*, 154265 f).

Distribution : Kashmir, alt. 3500 m.

NEW COMPOUNDS



Adoxoside

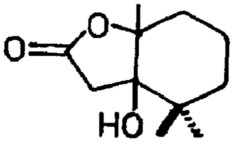
AEGINETIA (Orobanchaceae)

A. indica L.

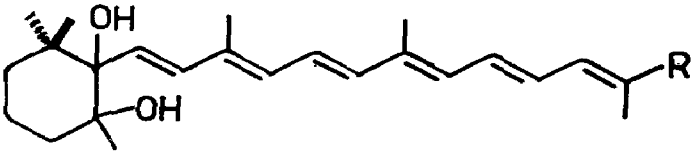
β-Sitosterol, aeginetic acid and a lactone isolated (*Indian J. Chem.* 1973, *11*, 404); three polyene compounds D,E and F isolated and characterised; compounds D and E contained six conjugated double bonds (*Indian J. Chem.* 1974, *12*, 414; *ibid.* 1977. *15*B, 550); structures of aeginetic acid and aeginetolide elucidated (*Indian J. Chem.* 1974, *12*, 413; *ibid*, 1977, *15*B, 546).

Distribution : Throughout India, from western Himalayas in Kumaon to Nepal, Assam and Khasi Hills, ascending to 1600 m and southwards to Travancore.

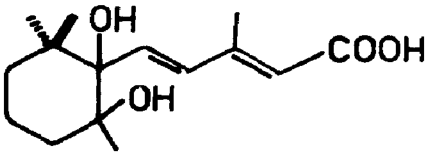
NEW COMPOUNDS



Aeginetolide



Compound E
R = COOH
Compound F
R = CH=CHCOOH



Aeginetic acid

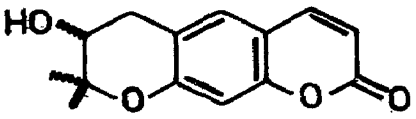
AEGLE (Rutaceae)

A. marmelos (L.) Correa (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 13).

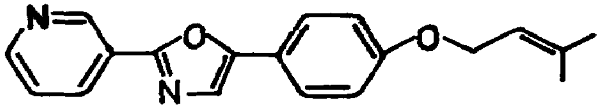
Bark, leaves and fruits used for treatment of intestinal diseases (*Sci. Res.* 1970, *7*, 122; *Chem. Abstr.* 1973, *78*, 1973 s); essential oil from leaves had broad spectrum antifungal activity comparable to that of 0.5% hamycin (*Indian Drugs Pharm. Ind.* 1977, *12*, 55; *Chem. Abstr.* 1977, *87*, 130449 k); extract of fruits lowered blood sugar level in normal rabbits significantly but in diabetic rabbits reduction was insignificant (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 63).

Compound A, mp. 160°, compound B, mp. 195° and β-sitosterol from bark; alkaloids A, mp. 172°, and B, mp. 136°, isolated from plant (*Sci. Res.* 1970, *7*, 122; *Chem. Abstr.* 1973, *78*, 1973 s); a phenolic base containing oxazole and pyridine moieties isolated from leaves (*Indian J. Chem.* 1971, *9*, 763); detection of α-phellandrene, p-cymene, cineole, d-limonene, ethyl n-amylketone, methyl n-heptylketone, citronellal, linalool, citral, eugenol, caryophyllene and cuminyl alcohol in essential oil by GLC (*Indian Oil Soap J.* 1972, *37*, 301; *Chem. Abstr.* 1974, *80*, 40922 k); xanthotoxin, 6,7-dimethoxycoumarin, scopoletin, tembamide, umbelliferone, marmesin, marmin, skimmianine and a glycoside - skimmin - from roots (*Phytochemistry* 1973, *12*, 2071); leaves contained tannins, phlobatannins, flavan-3-ols, leucoanthocyanins, anthocyanins and flavonoid glycosides (*J. Inst. Chemists*, Calcutta 1975, *47*, 79; *Chem. Abstr.* 1975, *83*, 144519 n); polysaccharides isolated from fruit pulp yielded on hydrolysis galactose (20.4). arabinose (10.7), uronic acid (25.2%) and trace of L-rhamnose (*Bangladesh J. Sci. Ind. Res.* 1977, *12*, 41; *Chem. Abstr.* 1977, *87*, 197267 t); skimmianine from bark (*Bangladesh J. Sci. Ind. Res.* 1978, *13*, 252; *Chem. Abstr.* 1979, *90*, 183156 f); a minor lactonic constituent - aegelinol - isolated and its stereostructure determined (*Phytochemistry* 1978, *17*, 328); structure of furocoumarin - marmelide (*Chem. Ind.* 1978, 848); four new alkaloids - O-(3,3-dimethylallyl)-halfordinol (I), N-2-ethoxy-2-(4-methoxyphenyl)ethyl cinnamamide (II), N-2-methoxy-2-[4-(3,3-dimethylallyloxy)phenyl]ethyl cinnamamide (III) and N-2-methoxy-2-(4-methoxyphenyl)ethyl cinnamamide (IV) - isolated from leaves and their structures determined (*Phytochemistry* 1978, *17*, 1814).

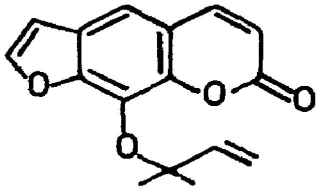
NEW COMPOUNDS



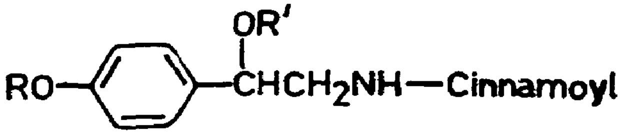
Aegelinol



I



Marmelide



II

R = Me, R′ = Et

III

R = $CH_2CH=CMe_2$, R′ = Me

IV

R,R′ = Me

BIOLOGICAL ACTIVITY

Marmelide exhibited tyrosinase accelerating and tryptophan pyrrolase inhibitory effects in *Bufo melanostictus* (*Chem. Ind.* 1978, 848); skimmianine at 100-150 mg/kg, p.o. had sedative, hypothermic and antidiuretic effects in mice and rats. Synergism between skimmianine (75 mg/kg) and aminazine (5 mg/kg, i.p.) and antagonism between skimmianine and amphetamine (10 mg/kg, s.c.) were observed (*Farmakol. Alkaloidov Serdechnykh Glikozodov* 1971, 167; *Chem. Abstr.* 1973, *78*, 119189 u).

AERVA (Amaranthaceae)

A. javanica (Burm.f.) Juss. ex J. A. Schultes syn. *A. tomentosa* Forsk. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 8).

Kaempferol-3-galactoside, kaempferol-3-rhamnogalactoside, β-sitosterol, its palmitate and α-amyrin isolated (*Indian J. Chem.* 1973, *11*, 89).

A. lanata Juss. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 9).

β-Sitosterol, its palmitate and α-amyrin from heartwood (*Indian J. Chem.* 1973, *11*, 89).

A. tomentosa Forsk.; see *A. javanica* (Burm.f.) Juss. ex J. A. Schultes

AESCHYNOMENE (Papilionaceae)

A. indica L.

Vicenin-2, reynoutrin, rutin, myricitrin and robinin were isolated from Formosan plant (*Shoyakugaku Zasshi* 1977, *31*, 172; *Chem. Abstr.* 1978, *88*, 148947 b).

Distribution : Throughout plains of India, ascending to 1500 m in hills.

AESCULUS (Hippocastanaceae)

A. hippocastanum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 14).

In bark extract, C-15-35 alkanes determined by GC (3.09%); ratio of odd homologous to even homologous alkanes 1.65:1 (*Collect. Czech. Chem. Commun.* 1978, *43*, 320); methods for isolation of escin (Ger. 2,733,204 (1978) Feb. 16; *Chem. Abstr.* 1978, *88*, 166948 g; Fr. 2,361,420 (1978) Mar. 10; *Chem. Abstr.* 1979, *90*, 12295 w).

BIOLOGICAL ACTIVITY

Saponin fraction was less toxic to mice (i.p. LD50 46.5 mg/kg) than reparil (9.5 mg/kg). It inhibited prostaglandin synthetase *in vitro*. Saponin produced initial hypotension followed by long-lasting hypertension in anaesthetised animals. It contracted isolated rabbit ileum (*Herba Pol.* 1976, *22*, 154; *Chem. Abstr.* 1978, *88*, 31943 f).

A. indica Colebr. ex Camb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 8).

Quercetin, β-sitosterol and escin from leaves (*Planta Med.* 1978, *34*, 337); rutin and astragalin from stem (*Fitoterapia* 1978, *49*, 247; *Chem. Abstr.* 1979, *91*, 105216 g).

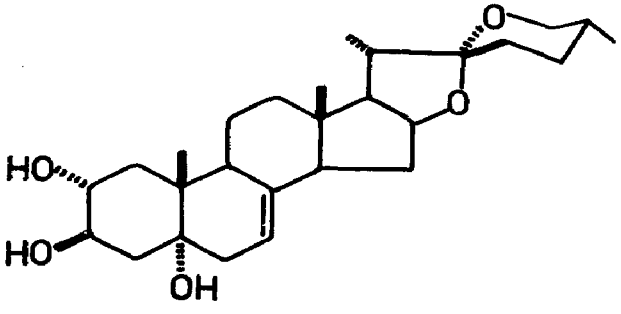
AGAPANTHUS (Alliaceae)

A. africanus Hoffmgg.

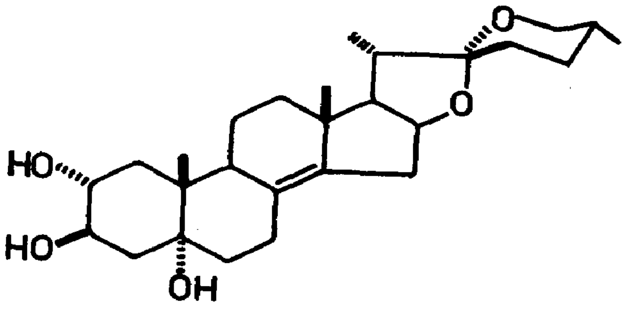
Besides sitosterol, yuccagenin and agapanthagenin, two new spirostan sapogenins - 7-dehydroagapanthagenin and 8(14)-dehydroagapanthagenin - isolated from rhizomes (*Phytochemistry* 1974, *13*, 627).

Distribution : Native of South Africa, grown in Indian gardens as ornamental.

NEW COMPOUNDS



7-Dehydroagapanthagenin



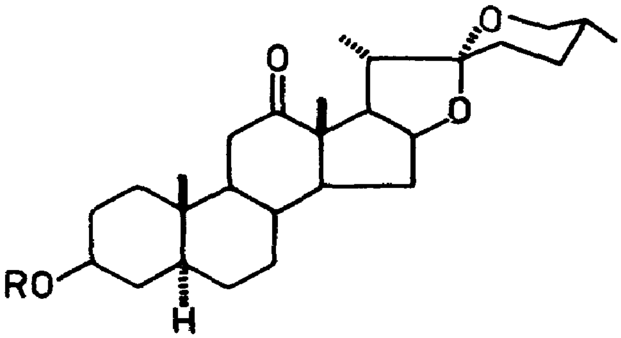
8 (14)-Dehydroagapanthagenin

AGAVE (Agavaceae)

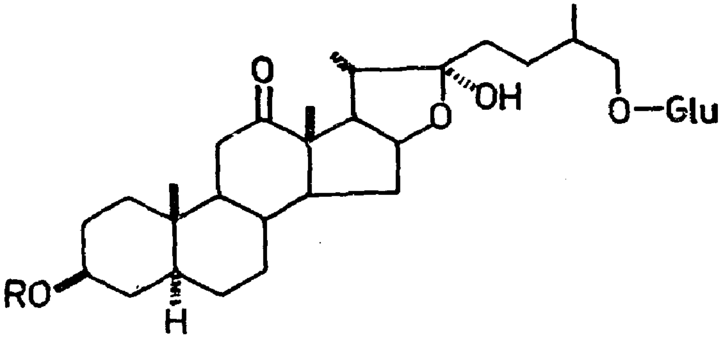
A. americana L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 15).

Hecogenin and 25D-5α-spirostan-3β-ol-12-one, mp. 252°, from leaves (*Planta Med.* 1971, *19*, 87); ten steroidal saponins - agavosides A,B,C,C',D,E,F,G,H and I - isolated from leaves; common aglycone was hecogenin while sugars were glucose, galactose, xylose and rhamnose (*Dokl. Akad. Nauk* SSR, 1975, *224*, 1442; *Chem. Abstr.* 1976, *84*, 102277 x; *Pharmazie* 1975, *30*, 396; *Chem. Abstr.* 1975, *83*, 144506 f; *Tezisy Dokl. Soobshch. - Konf. Molodykh Uch. Mold.* 1975, 100; *Chem. Abstr.* 1976, *85*, 2511 w); structures of agavosides A,B,C,C',D, and E elucidated (*Khim. Prir. Soedin.* 1975, *11*, 104; *Chem. Abstr.* 1975, *83*, 75370 t; *Tezisy Dokl.-Vses Simp. Bioorg. Khim.* 1975, 20; *Chem. Abstr.* 1976, *85*, 160461 j); structures of agavasaponin E and agavasaponin H (agavosides E and H) elucidated (*Phytochemistry* 1975, *14*, 2657); isolation of hecogenin (*Chih Wu Hsueh Pao* 1976, *18*, 156; *Chem. Abstr.* 1976, *85*, 198079 d); structure of agavoside G (*Khim. Prir. Soedin.* 1976, *12*, 486; *Chem. Abstr.* 1977, *86*, 5754 j).

NEW COMPOUNDS



Agavoside A
R = Gal
Agavoside B
R = Gal (4→1)Glu
Agavoside C
R = Gal (4→1)Glu(4→1)Glu
Agavoside C'
R = Gal(4→1)Glu(4→1)Glu(2→1)Glu
Agavoside D
R = Gal (4→1)Glu(4→1)Glu[(2→1)Glu](3→1)Rha
Agavoside E
R = Gal (4→1)Glu(4→1)Glu[(2→1)Xyl](3→1)Rha(4→1)Rha



Agavoside G

R = Gal(4→1)Glu(4→1)Glu[(2→1)Xyl](3→1)Rha

Agavoside H

R = Gal(4→1)Glu(4→1)Glu[(2→1)Xyl](3→1)Rha(4→1)Rha

A. angustifolia Haw. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 9).

Hecogenin was isolated (*Chih Wu Hsueh Pao* 1976, *18*, 156; *Chem. Abstr.* 1976, *85*, 198079 d).

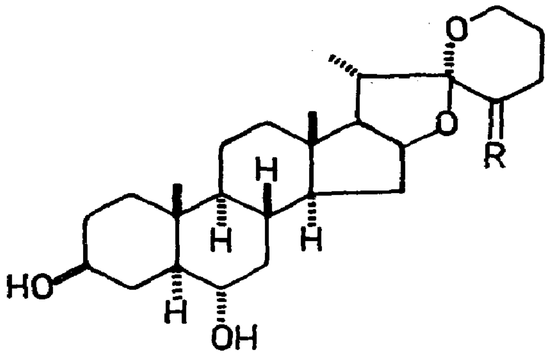
A. cantala (Haw.) Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 15).

Hecogenin was isolated (*Chih Wu Hsueh Pao* 1976, *18*, 156; *Chem. Abstr.* 1976, *85*, 198079 d).

A. sisalana Perr. ex Engelm. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 16).

Hecogenin, tigogenin, neotigogenin, sisalagenin, gloriogenin, gentrogenin, 9,11-dehydrohecogenin, diosgenin and yamogenin from leaves (*Lloydia* 1974, *37*, 10); hecogenin and tigogenin isolated (*Rev. Soc. Quim. Mexico* 1974, *18*, 177; *Chem. Abstr.* 1975, *82*, 28508 p; *Indian J. Pharm.* 1974, *36*, 119; *Chih Wu Hsueh Pao* 1976, *18*, 156; *Chem. Abstr.* 1976, *85*, 198079 d); two new trihydroxysapogenins - hainangenin and hongguangenin - isolated along with known compounds - tigogenin, neotigogenone, neotigogenin, sisalagenin, hecogenin, 5α-pregnan-3β,20β-diol, rockogenin, 12-epirockogenin, chlorogenin and β-sitosterol - from leaves (*Hua Hsueh Hsueh Pao* 1976, *34*, 179; *Chem. Abstr.* 1978, *88*, 117762 h); rockogenin isolated from leaves was artefact formed by enzymatic transformation of hecogenin during processing of sisal juice (*Lloydia* 1977, *40*, 218).

NEW COMPOUNDS



Hainangenin
R = α-H, β-OH
Hongguangenin
R = α-OH,β-H

A. vera-cruz Mill. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 9).

Hecogenin and 9(11)-dehydrohecogenin from leaves (*Indian J. Chem.* 1974, *12*, 429); trisaccharides - 1-kestose and neokestose - tetrasaccharides - nystose and another related to neokestose - isolated from stem (*Carbohydr. Res.* 1977, *54*, 275; *Chem. Abstr.* 1977, *86*, 167907 p).

AGERATIA (Asteraceae)

A. riparia (Regel.) R.M. King & H. Robins syn. *Eupatorium cannabinum* sensu Hook.f. (non L.) p.p., *Eupatorium riparium* Regel. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 113).

Taraxasterol, its palmitate and stigmasterol isolated (*J. Indian Chem. Soc.* 1978, *55*, 296).

AGERATUM (Asteraceae)

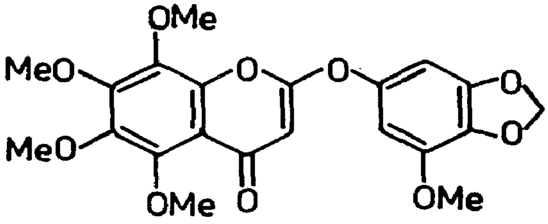
A. conyzoides L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 16).

Pharmacognostic studies on roots (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 126).

Volatile oil found to contain ageratochromene, caryophyllene, γ-cadinene and 6-demethoxyageratochromene (*Perfum. Essent. Oil Rec.* 1969, *60*, 303; *Chem. Abstr.* 1970, *72*, 51815 p; *Flavour Ind.* 1973, *4*, 77; *Chem. Abstr.* 1973, *79*, 96835 f; *Sci.* 1976, *193*, 542); demethoxyageratochromene (60.66), β-caryophyllene (14.52), d-α-pinene (6.62), ocimene (5.3), d-cadinene (4.25), eugenol (4.42) and methyleugenol (1.82%) detected in essential oil by TLC (*Riechst., Aromen, Koerperpflegem* 1973, *23*, 209; *Chem. Abstr.* 1973, *79*, 96837 h); 7-methoxy-2,2-dimethylchromene (6-demethoxyageratochromene) and ageratochromene dimer (6,6′,7,7′-tetramethoxy-2,2,2′,2′,-tetramethyl-3′(4′)-dehydro-3′,4S-bichroman) from essential oil (*Indian J. Chem.* 1973, *11*, 91); saturated aliphatic hydrocarbons (n-C27-32),

stigmasterol and α-spinasterol isolated (*Tai-wan K'o Hsueh* 1976, *30*, 101; *Chem. Abstr.* 1977, *86*, 52655 n); stigmast-7-en-3-ol, quercetin, kaempferol, fumaric and caffeic acids identified in leaves (*Indian J. Pharm.* 1977, *39*, 108); structure of a new chromone - conyzorigun (*Chem. Commun.* 1978, 152); quercetin, kaempferol-3-rhamnoglucoside, kaempferol-3,7-diglucoside, an unidentified quercetin derivative isolated (*Acta Pol. Pharm.* 1978, *35*, 241; *Chem. Abstr.* 1978, *89*, 176387 h).

NEW COMPOUNDS



Conyzorigun

AGLAIA (Meliaceae)

A. anamallayana (Bedd.) Kosterm. syn. *Lansium anamallayanum* Bedd.

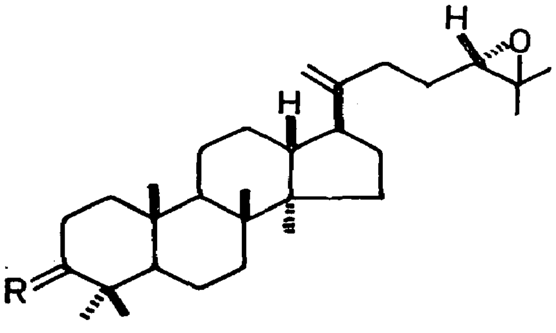
(-)α-Gurjunene, (-)α-trans-bergamotene and (-)β-bisabolene from wood essential oil (*Phytochemistry* 1973, *12*, 823).

Distribution : South-west India in semi-evergreen forests in Eastern and Western Ghats.

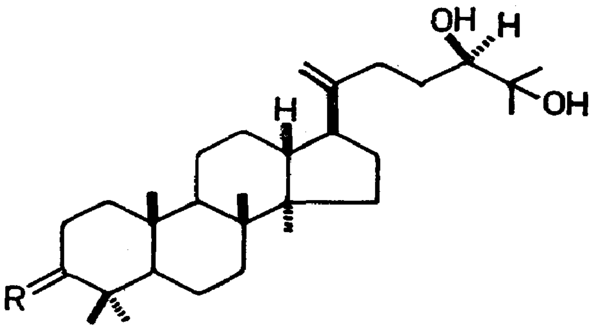
A. odorata Lour. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 17).

Isolation and structure of three dammarane triterpenoids (I, II and III); stereochemistry at C-24 of these triterpenoids and of aglaiol elucidated (*J. Chem. Soc.* Perkin 1 1977, 510).

NEW COMPOUNDS



I
R = O
Aglaiol
R = H, β-OH



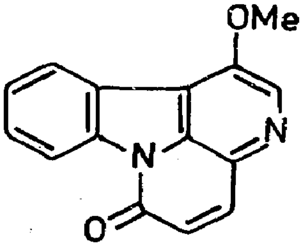
II
R = α-OH, H
III
R = O

AILANTHUS (Simaroubaceae)

A. altissima (Mill.) Swingle syn. *A. glandulosa* Desf. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 17).

A new alkaloid - 1-methoxycanthin-6-one - was isolated along with canthin-6-one and canthin-6-one-3-oxide (*Chem. Pharm. Bull.* 1976, *24*, 1532); in addition, an unidentified alkaloid, β-sitosterol, scopoletin and a fatty acid isolated from root bark (*Herba Hung.* 1977, *16*, 15; *Chem. Abstr.* 1978, *88*, 166719 n).

NEW COMPOUNDS

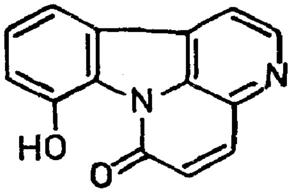


1-Methoxycanthin-6-one

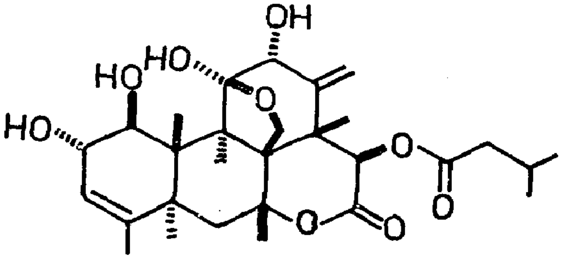
A. excelsa Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 18).

β-Sitosterol and vitexin isolated (*Phytochemistry* 1971, *10*, 3333); a new compound - 13,18-dehydroglaucarubol-15-isovalerate (I) - isolated along with ailanthione, glaucarubinone and glaucarubol-15-isovalerate from root bark (*Lloydia* 1977, *40*, 579); a new alkaloid - 8-hydroxycanthin-6-one - isolated and characterised along with canthin-6-one, 1-methoxycanthin-6-one and 5-methoxycanthin-6-one from root bark (*Lloydia* 1978, *41*, 166).

NEW COMPOUNDS



8-Hydroxycanthin-6-one



I

BIOLOGICAL ACTIVITY

Ailanthione showed anticancer activity in P-388 lymphocytic leukaemia in dose range 0.12-400 mg/kg in mice; also active in KB test system. Glaucarubinone showed wider spectrum of activity in P-388 lymphocytic leukaemia and Lewis lung B16 melanoma in dose range 0.12-0.5 mg/kg; also active in KB system (*Llyodia* 1977, *40*, 579).

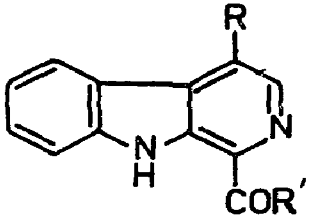
A. glandulosa Desf.; see *A. altissima* (Mill.) Swingle

A. malabarica DC.; see *A. triphysa* (Dennst.) Alston

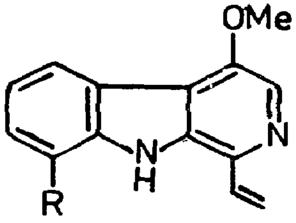
A. triphysa (Dennst.) Alston syn. *A. malabarica* DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 18).

Five new alkaloids - 1-acetyl-β-carboline (I), 1-acetyl-4-methoxy-β-carboline (II), 4,8-dimethoxy-1-vinyl-β-carboline. (dehydrocrenatidine) (III), dehydrocrenatine (IV) and 1-carbamoyl-β-carboline (V) - isolated in addition to 1-carbomethoxy-β-carboline, crenatidine and crenatine from bark and roots (*Heterocycles* 1977, *7*, 193).

NEW COMPOUNDS



I
R = H, R' = Me
II
R = OMe, R' = Me
V
R = H, R' = NH_2



III
R = OMe
IV
R = H

AJANIA (Asteraceae)

A. fruticulosa (Ledeb.) P. Polijakav; see *Tanacetum fruticulosum* Ledeb.

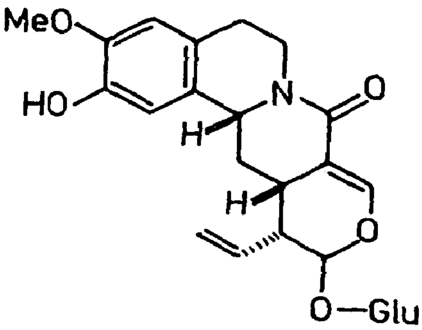
ALANGIUM (Alangiaceae)

A. lamarckii Thwaites; see *A. salvifolium* (L.f.) Wang.

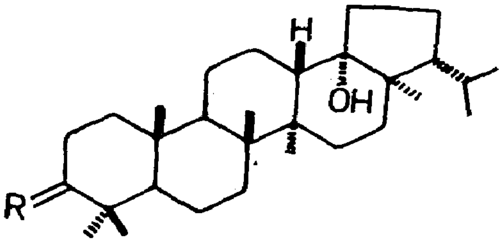
A. salvifolium (L.f.) Wang. syn. *A. lamarckii* Thwaites (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 19).

A new alkaloid - demethylcephaeline - along with cephaeline, psychotrine, tubulosine and demethylpsychotrine isolated from stem bark; substance AL 60, previously reported to have hypotensive activity, shown to be mixture of psychotrine, cephaeline and demethylcephaeline (*Experientia* 1970, *26*, 933); isolation and characterisation of a new sterol - stigmast-5,22,25-trien-3β-ol - from leaves (*Tetrahedron Lett.* 1971, 365); a monoterpenoid lactam - alangiside - isolated and its structure elucidated (*J. Chem. Soc.* C 1971, 904; *J. Chem. Soc.* Perkin 1 1975, 1245); N-benzoyl-L-phenylalaninol, mp. 169°, was isolated (*Indian J. Chem.* 1974, *12*, 1218); structures of new D,E-cis fused neohopane derivatives - alangidiol and isoalangidiol (*Tetrahedron Lett.* 1975, 4275); stereostructure and synthesis of (±) alangicine (*Tetrahedron Lett.* 1976, 2553); structure and relative configuration of (±)alangimarckine determined by its partial synthesis (*Tetrahedron Lett.* 1977, 3477).

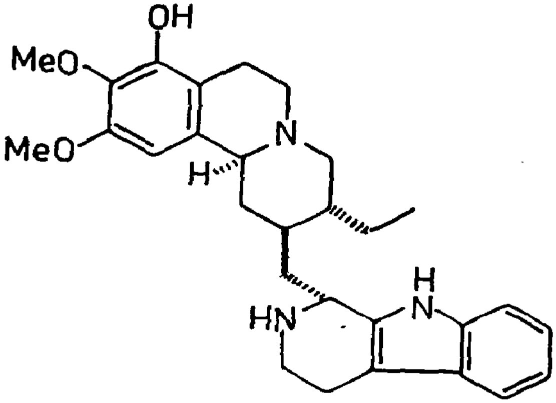
NEW COMPOUNDS



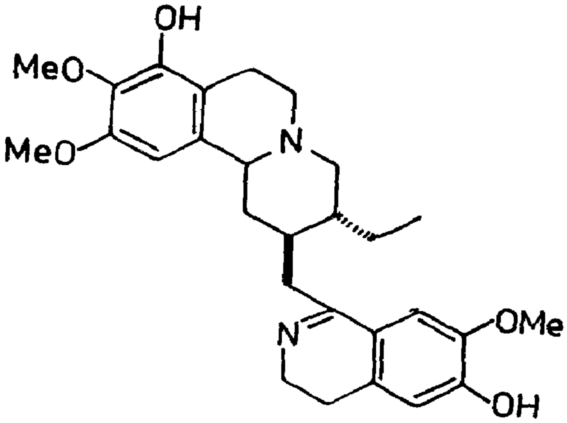
Alangiside



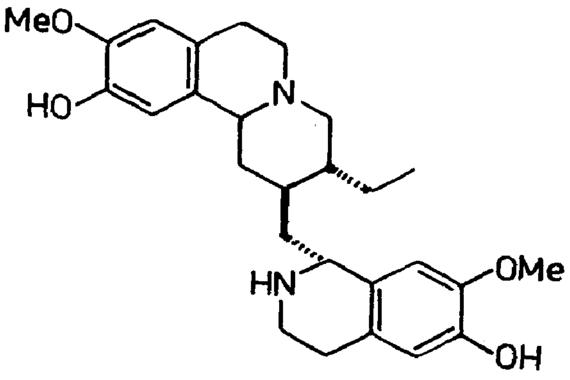
Alangidiol
R = H, α-OH
Isoalangidiol
R = β-OH, H



Alangimarckine



Alangicine



Demethylcephaeline

BIOLOGICAL ACTIVITY

Sublethal doses of emetine hydrochloride (10.0 mg/kg) at 12 and 24 hr intervals induced morphological changes in kidney including formation of vacuoles, swelling of mitochondria,

disruption of basal membranes, deterioration of red blood cells and production of convoluted membranes and fibril-like structures (*Cytobios* 1977, *19*, 109; *Chem. Abstr.* 1978, *89*, 173715 c).

ALBIZIA (ALBIZZIA) (Mimosaceae)

A. chinensis (Osbeck) Merr. syn. *A. stipulata* sensu Baker p.p. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 10).

Seeds showed marked hypoglycaemic activity in normal rats but not in alloxan-diabetic rats (*Indian J. Pharmacol.* 1975, *7*, 47).

A. julibrissin Durazz. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 10).

Serotonin and norepinephrine were found in concentrations of 4.0 μg/g of fresh plant tissue (*Phytochemistry* 1973, *12*, 191); 4,6-dimethyoxyphthalide, (+)pinitol, α-spinasterol and α-spinasterone from heartwood (*Mokuzai Gakkaishi* 1975, *21*, 577; *Chem. Abstr.* 1976, *84*, 102290 w); beans yielded a saponin - albiside, mp. 183° - which consisted of echinocystic acid and the sugars, glucose, xylose, arabinose, fucose and rhamnose in ratio of 2:1:2:1:1 (*Khim. Prir. Soedin.* 1977, *13*, 708; *Chem. Abstr.* 1978, *88*, 85989 u).

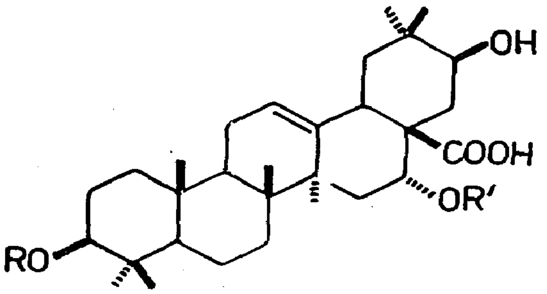
A. lebbeck (L.) Benth. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 21).

Bark and flower decoctions protected guinea pig against histamine and acetylcholine-induced bronchospasm. Chronic treatment with bark decoction also protected sensitised guinea pigs against antigen challenge. Drug showed anti-asthmatic and anti- anaphylactic activities due to inhibition of phenomenon of sensitisation (*Indian J. Pharmacol.* 1977, *9*, 189). Pharmacognostic study of stem bark (*J. Res. Indian Med.* 1973, *8*, 29).

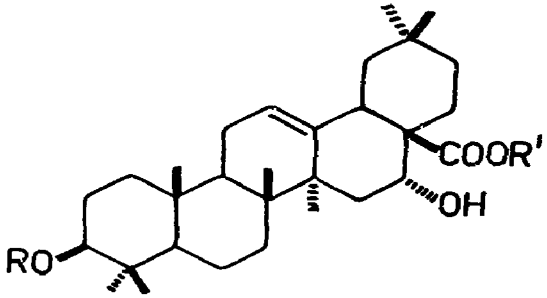
Echinocystic acid and β-sitosterol identified in bark and seeds (*Indian J. Appl. Chem.* 1969, *32*, 73; *Chem. Abstr.* 1971, *75*, 16035 z); saponin mixture from pods and seeds on hydrolysis yielded echinocystic acid, oleanolic acid, albigenin and albigenic acid (*Bull. Chem. Soc. Jpn.* 1970, *43*, 446; *Indian J. Appl. Chem.* 1971, *34*, 214; *Chem. Abstr.* 1972, *77*, 85583 e); a new saponin - lebbekanin C - on acid hydrolysis yielded echinocystic acid, glucose and rhamnose (*Planta Med.* 1973, *24*, 183); friedelan-3-one (friedelin) and γ-sitosterol from bark (*Curr. Sci.* 1974, *43*, 46); a new triterpenic saponin - lebbekanin A, mp. 205° - from seeds, composed of glucose, galactose, arabinose, xylose, fucose and rhamnose in ratio of 5:1:1:1:1:2 and echinocystic acid (*Indian J. Chem.* 1973, *11*, 1094); another saponin - lebbekanin D - on acid hydrolysis yielded echinocystic acid, glucose, galactose, arabinose, xylose and rhamnose (*J. Indian Chem. Soc.* 1975, *52*, 1202); lebbekanin E, mp. 125°, isolated and shown to consist of acacic acid and glucose, arabinose, xylose and rhamnose in ratio of 4:2:1:1 (*J. Indian Chem. Soc.* 1976, *53*, 859; *Nat. Acad. Sci. Lett.* 1979, *2*, 135; *Chem. Abstr.* 1979, *91*, 120369 c); in addition to melacacidin and melanoxetin, two new compounds - (-)2,3-cis-3,4-cis-3-O-methylmelacacidin as its methyl ether and 3′-O-methylmelanoxetin - isolated from heartwood (*Indian J. Chem.* 1977, *15B*, 201); plant contained three non-protein sulphur amino acids;

mature leaves contained keto acids including phosphoenolpyruvate, glyoxalate, oxalacetate and α-oxoglutarate (*Plant Biochem. J.* 1977, *4*, 34; *Chem. Abstr.* 1977, *87*, 148762 s); vicenin-2, reynoutrin, rutin, myricitrin and robinin from leaves (*Shoyakugaku Zasshi* 1977, *31*, 172; *Chem. Abstr.* 1978, *88*, 148947 b).

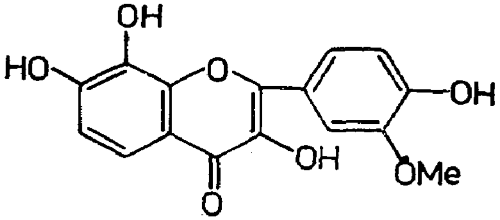
NEW COMPOUNDS



Lebbekanin E
R,R' = Glu. Ara, Xyl, Rha



Lebbekanin C
R = Glu-Rha, R' = H
Lebbekanin A
R,R' = Glu, Gal, Ara, Xyl, Fuc, Rha



3'-O-Methylmelanoxetin

A. lucida (Roxb.) Benth. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 22)

Echinocystic acid and β-sitosterol identified in bark and seeds (*Indian J. Appl. Chem.* 1969, *32*, 73; *Chem. Abstr.* 1971, *75*, 16035 z).

A. odoratissima (L.f.) Benth. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p.22).

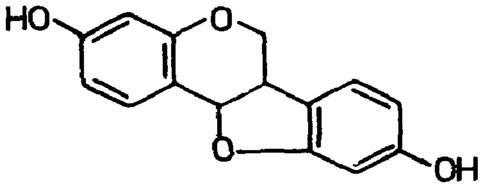
Seeds showed marked hypoglycaemic activity in normal rats but not in alloxan-diabetic rats (*Indian J. Med. Res.* 1976, *64*, 754).

A. procera (Roxb.) Benth. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 23).

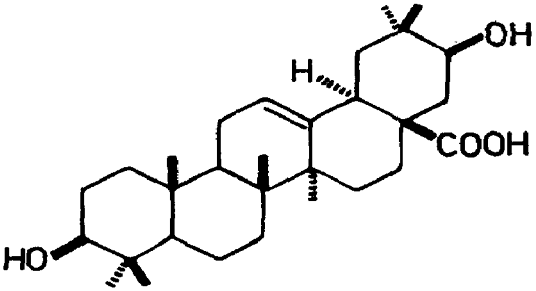
Degraded gum contained galactose, mannose, glucuronic acid and 4-O-methyl-D-glucuronic acid (*Indian J. Chem.* 1970, *8*, 143); a new triterpene saponin - proceranin A, mp. 180° - from seeds, composed of proceric acid as genin and glucose, galactose, arabinose, xylose, fucose and rhamnose in ratio of 4:1:1:1:1:2 (*Arch. Pharm. Ber. Deut. Pharm. Ges.* 1972,

305, 280; *Chem. Abstr.* 1972, *77*, 45522 c; *Indian J. Chem.* 1973, *11*, 1189); a new pterocarpan - demethylmedicarpin, biochanin A, formononetin, genistein and daidzein isolated from bark (*Indian J. Chem.* 1977, *15B*, 201); α-spinasterol, oleanolic acid and an unidentified compound from roots; α-spinasterol, hentriacontane and hexacosanol from leaves (*Indian J. Pharm. Sci.* 1979, *41*, 115).

NEW COMPOUNDS



Demethylmedicarpin



Proceric acid

BIOLOGICAL ACTIVITY

Spermicidal activity against human sperms exhibited by saponin from roots (*Indian J. Pharm. Sci.* 1979, *41*, 115).

A. stipulata Baker ; see *A. chinensis* (Osbeck) Merr.

ALCIMANDRA (Magnoliaceae)

A. cathcartii (Hook.f. & Thoms.) Dandy syn. *Michelia cathcartii* Hook.f. & Thoms.

Lepcha - Atokdung, Gokdum; Khasi - Dieng-rai; Nep. - Kala champ, Tite champ.

Lanuginosine, michlanugine, liriodenine and β-sitosterol isolated from leaves, root bark and stem bark (*Phytochemistry* 1973, *12*, 2305).

Distribution : Assam, Sikkim and other states of eastern India, alt. 100-2000 m.

ALEURITES (Euphorbiaceae)

A. montana (Lour.) E.H. Wils.; see *Vernicia montana* Lour.

A. fordii Hemsl.; see *Vernicia fordii* (Hemsl.) Airy Shaw

ALHAGI (Papilionaceae)

A. mourorum Baker; see *A. pseudalhagi* (Bieb.) Desv.

A. pseudalhagi (Bieb.) Desv. syn. *A. mourorum* sensu Baker (non Desv.) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 11).

Five β-phenethylamine and one tetrahydroisoquinoline alkaloids isolated from stems and identified as β-phenethylamine, N-methyl-β-phenethylamine, hordenine, 3,4-dihydroxy-β-phenethyltrimethylammonium hydroxide, N-methylmescaline and salsodine (*J. Pharm. Sci.* 1973, *62*, 1555).

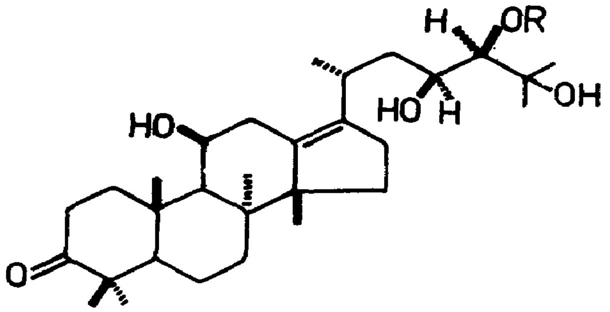
ALISMA (Alismataceae)

A. plantago-aquatica L.

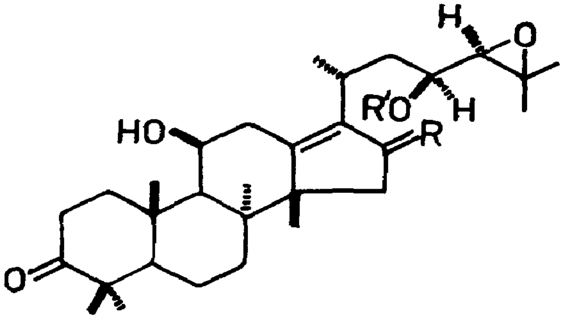
Alisol A, its monoacetate, alisol B, its monoaceate and alisol C monoacetate isolated from rhizomes (*Chem. Pharm. Bull.* 1970, *18*, 1347).

Distribution : Bengal, Bihar and Lower Himalayas from Kashmir to Manipur.

NEW COMPOUNDS



Alisol A
R = H
Alisol A monoacetate
R = Ac



Alisol B
R = H,H, R′ = H
Alisol B monoacetate
R = H,H, R′ = Ac
Alisol C monoacetate
R = O, R′ = Ac

BIOLOGICAL ACTIVITY

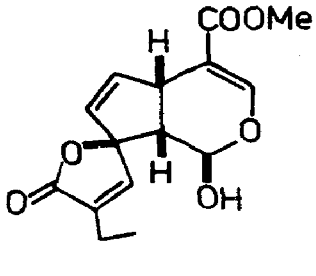
Alisol A, its monoacetate, alisol B monoacetate and alisol C monoacetate were found to possess hypocholesterolaemic activity (*Chem. Pharm. Bull.* 1970, *18*, 1347).

ALLAMANDA (Apocynaceae)

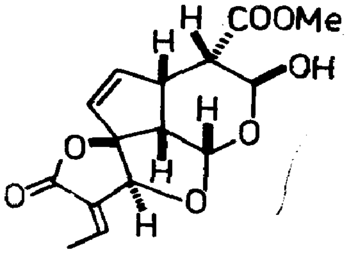
A. cathartica L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 11).

Plumericin and isoplumericin from stem and root bark (*Indian J. Chem.* 1970, *8*, 851); iridoid lactones - allamandin, allamandicin and allamdin - isolated and characterised (*J. Org. Chem.* 1974, *39*, 2477).

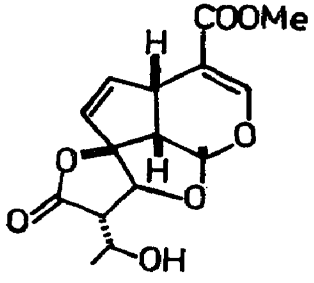
NEW COMPOUNDS



Allamdin



Allamandin



Allamandicin

BIOLOGICAL ACTIVITY

Allamandin, allamandicin and allamdin showed antileukaemic activity (*J. Org. Chem.* 1974, *39*, 2477).

ALLIUM (Liliaceae)

A. cepa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 24).

Onion extract lowered blood sugar in normal and alloxan-diabetic rabbits (*Indian J. Med. Res.* 1973, *61*, 1066; *Indian J. Physiol. Pharmacol.* 1976, *19*, 213); hypoglycaemic effect is probably produced by reduction rate of glycogenolysis and neoglucogenesis in liver (*Indian J. Pharmcol.* 1976, *8*, 153); extract significantly reduced serum, liver and aorta triglycerides and serum and liver proteins in sucrose-fed rats, while free amino acids in liver were significantly increased (*Indian J. Physiol. Pharmacol.* 1979, *23*, 27).

Isolation of peptides - γ-L-glutamyl-L-arginine and γ-L-glutamyl-S-(2-carboxy-N-propyl)-cysteine (*Suom. Kemistil.* B 1970, *43*, 435; *Chem. Abstr.* 1971, *74*, 61610 y); a comparative chemical study of three varieties revealed that two (Nasik Ki Piyaz and Desi Piyaz) contained free quercetin (3.0 and 1.2% respectively) but a third (Malvi Piyaz) contained none (*Indian J. Appl. Chem.* 1971, *34*, 142; *Chem. Abstr.* 1972, *77*, 85626 w); kaèmpferol and quercetin isolated (*J. Indian Chem. Soc.* 1974, *51*, 975); diosgenin from flowers (0.32) and bulbs (0.18%) (*Uch. Zap. Azerb. Gos. Med. Inst.* 1974, *37*, 60; *Chem. Abstr.* 1977, *87* 180731 s); S-methylcysteine sulphoxide, S-propylcysteine sulphoxide and S-propylcysteine obtained (*Curr. Sci.* 1976, *45*, 863); two unidentified saponins found (*Zesz. Nauk-Akad. Ekon. Poznaniu*, Ser. I 1976, *69*, 104; *Chem. Abstr.* 1977, *87*, 164252 f).

A. clarkei Hook.f.; see *A. tuberosum* Rottl. ex Spreng.

A. odorum L.; see *A. tuberosum* Rottl. ex Spreng.

A. sativum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 25).

Blood cholesterol level was significantly decreased in all human subjects after two months ingestion of garlic (*Indian J. Physiol. Pharmacol.* 1979, *23*, 1979).

Isolation of biologically active compound - scordinin A_1 - which on alkaline hydrolysis yielded a peptide, scormin and allylthiofructosiduronic acid (*Chem. Pharm. Bull.* 1969, *17*, 2198); five unidentified saponins found (*Zesz. Nauk Akad. Ekon. Poznaniu* Ser. I 1976, *69*, 104; *Chem. Abstr.* 1977, *87*, 164252 f); garlic bulbs yielded a mixture of polysaccharides containing pectic acid, a D-galactan and a fructan component which contained fructose (94.4) and glucose (4.3%); a linear inulin-type of structure suggested for fructan on basis of methanolysis (*Carbohydr. Res.* 1978, *64*, 155; *Chem. Abstr.* 1978, *89*, 126115 x).

A. schoenoprasum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 25).

A water-soluble substance similar to abscisic acid from bulbs (*Kgl. Vet, Landbohoejsk.*

Arsskr. 1973, 39; *Chem. Abstr.* 1974, *80*, 93141 m).

BIOLOGICAL ACTIVITY

The water-soluble substance injected into nondormant bulbs induced growth inhibition similar to dormancy (*Kgl. Vet. Landbohoejsk. Arsskr.* 1973, 39; *Chem. Abstr.* 1974, *80*, 93141 m).

A. tuberosum Rottl. ex Spreng. syn. *A. tuberosum* Roxb.; *A. clarkei* Hook.f.; *A. odorum* auct. (non L.) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 12).

Detection of dimethyl disulphide, diallyl sulphide, methylallyl disulphide, dimethyl trisulphide, diallyldisulphide, methylallyl trisulphide, dimethyl tetrasulphide and linalool in essential oil from leaves by GLC (*Nippon Nogei Kagaku Kaishi* 1974, *48*, 385; *Chem. Abstr.* 1974, *81*, 152425 c).

A. tuberosum Roxb.; see *A. tuberosum* Rottl. ex Spreng.

ALOCASIA (Araceae)

A. fornicata (Roxb.) Schott syn. *Colocasia fornicata* Kunth

Hentriacontane, hentriacontanol, hentriacontanone, taraxeryl acetate, lignoceric acid, sitosterol and its glucoside isolated (*Phytochemistry* 1972, *11*, 2621).

Distribution : Plains of Bengal and Assam.

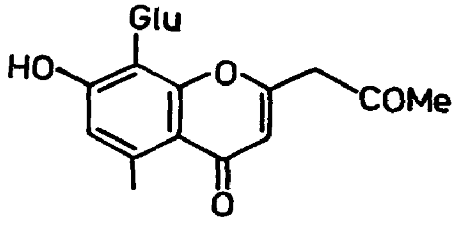
ALOE (Liliaceae)

A. barbadensis Mill.; see *A. vera* (L.) Burm.f.

A. perryi Baker (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 13).

Chromones - aloesin and aloesone - isolated (*Planta Med.* 1972, *22*, 54).

NEW COMPOUNDS



Aloesin

A. vera (L.) Burm.f. syn. *A. barbadensis* Mill. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 13).

Plant extract (100 mg/kg) inhibited ovulation in 80% rabbits. It also prevented implantation in 50 and 100% rats at oral dose of 100 and 200 mg/kg; these doses did not show any toxicity in rats (*J. Res. Indian Med.* 1971, *6*, 172).

Aloesin and aloesone isolated (*Planta Med.* 1972, *22*, 54); malic, citric and tartaric acids from leaves (*Sakyu Kenkyu* 1978, *24*, 49; *Chem. Abstr.* 1978, *89*, 39447 p); jelly from leaves composed of four partially acetylated glucomannans which differ in their glucose to mannose ratio and acetyl content (*Carbohydr. Res.* 1979, *72*, 201; *Chem. Abstr.* 1979, *91*, 35689 n).

ALOYSIA (Verbenaceae)

A. triphylla (L'Herit.) Britton syn. *Lippia citriodora* H. B. & K.

Eng. - Real vervain, Herba louisa, Sweet scented verbena, Lemon scented verbena.

Essential oil showed intestinal spasmolytic action in guinea pigs (*Rev. R. Acad. Farm. Barcelona* 1976, *14*, 39; *Chem. Abstr.* 1979, *90*, 209996 g).

Phenolic acids, flavonoids, hydrolysable tannins, alkaloids and mucilage detected in plant (*Rev. R. Acad. Farm. Barcelona* 1976, *14*, 39; *Chem. Abstr.* 1979, *90*, 209996 g); stigmasterol, its acetate, β-amyrin, β-sitosterol, their acetates and benzoates from stems (*Curr. Sci.* 1979, *48*, 534).

Distribution : Native of South America, grown in gardens specially in hilly regions.

ALPHONSEA (Annonaceae)

A. ventricosa Hook.f. & Thoms. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 13).

Glaucine and norglaucine isolated from leaves (*Indian J. Chem.* 1975, *13*, 306).

ALPINIA (Zingiberaceae)

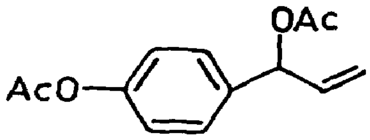
A. allughas (Retz.) Rosc. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 13).

Rhizomes yielded essential oil (0.05%) which contained caryophyllene oxide (23.07), geraniol (19.93), eudesmol (19.93), citronellyl acetate (16.5), citronellol (6.8), β-caryophyllene (5.45), α-pinene (3.84), linalool (2.86), (-)α-phellandrene (1.6) and geranyl acetate (0.16%) (*Riechst., Aromen, Koerperpflegem.* 1976, *26*, 139; *Chem. Abstr.* 1977, *86*, 60388 t).

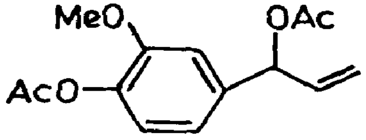
A. galanga Willd. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 13).

Fourteen flavonoids detected by chromatography, of which seven identified as quercetin, kaempferol, quercetin-3-methyl ether, isorhamnetin, kaempferide, galangin and its 3-methyl ether (*Planta Med.* 1972, *22*, 145); 1'-acetoxychavicol acetate (I) and 1'-acetoxyeugenol acetate (II) isolated from seeds along with caryophyllene oxide, caryophyllenol II, pentadecane, 7- heptadecene (Jpn. 74,36,817 (1972) Aug. 15; *Chem. Abstr.* 1974, *81*, 68544 h; *Chem. Pharm. Bull.* 1976, *24*, 2377).

NEW COMPOUNDS



I



II

BIOLOGICAL ACTIVITY

1′-Acetoxychavicol acetate and 1′-acetoxyeugenol acetate showed antiulcer activity (*Chem. Pharm. Bull.* 1976, *24*, 2377).

A. khulanjan M. Sheriff (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 13).

Essential oil from rhizomes showed seven components - methyl cinnamate (38.42), cineole (20.21), l-camphene (9.15), l-borneol (8.75), methyl chavicol (7.97), car-3-ene (7.34) and α-pinene (2.69%) (*Perfumes Kosmetik* 1977, *58*, 10; *Chem. Abstr.* 1977, *86*, 177156 g).

A. officinarum Hance (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 13).

Galangin, kaempferide, kaempferol and a glucoside obtained from roots (*Z. Naturforsch.* 1972, *27B*, 323; *Chem. Abstr.* 1972, *77*, 31555 d).

BIOLOGICAL ACTIVITY

A flavonoid from rhizomes showed strong antifungal activity against *Trichophyton rubrum*, *T. mentagrophytes*, *Epidermophyton floccosum* responsible for skin diseases. It also showed activity against a number of gram-positive and gram-negative bacteria and pathogenic and nonpathogenic yeasts (*Indian J. Exp. Biol.* 1976, *14*, 712).

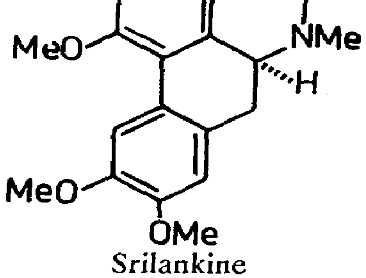
ALSEODAPHNE (Lauraceae)

A. semecarpifolia Nees

An aporphine alkaloid - srilankine - isolated and its structure established (*Tetrahedron Lett.* 1978, 4617).

Distribution : Western Ghats, from south Kanara southwards.

NEW COMPOUNDS



Srilankine

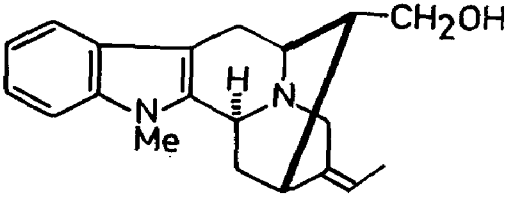
ALSTONIA (Apocynaceae)

A. macrophylla G. Don

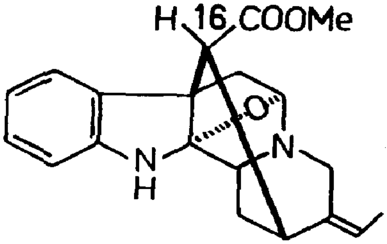
Three indole alkaloids - affinisine, picrinine and picralstonine - isolated and characterised (*Phytochemistry* 1972, *11*, 2605); another indole alkaloid - quebrachidine - along with β-sitosterol isolated from leaves (*Indian J. Chem.* 1973, *11*, 706); a bisindole base - (-)macrocarpamine - isolated from bark and its structure established (*Helv. Chem. Acta* 1978, *61*, 337).

Distribution : Malayan region. Appears to be introduced in some gardens in Calcutta.

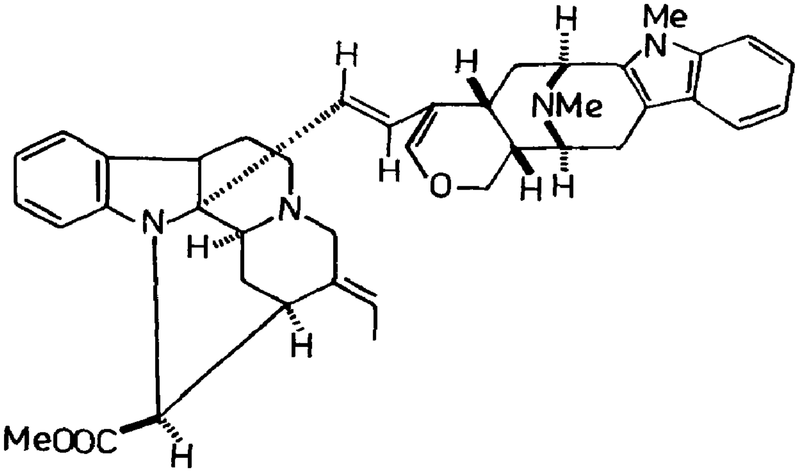
NEW COMPOUNDS



Affinisine



Picrinine
Picralstonine
(C-16 epimer)



Macrocarpamine

A. scholaris (L.) R. Br. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 26).

Picralinal, mp. 179°, from fresh leaves (*Experientia* 1970, *26*, 1056); akuammigine, tubotaiwine, akuammicine, akuammicine-Nb-oxide, its methiodide and hydroxy-19,20-dihydroakuammicine from roots (*Phytochemistry* 1976, *15*, 821); picrinine, strictamine, tetrahydroalstonine isolated (*Planta Med.* 1976, *30*, 86); n- hexacosane, lupeol, β-amyrin, palmitic acid and ursolic acid from flowers (*Planta Med.* 1977, *31*, 33); pseudoakuammigine,

betulin, ursolic acid and β-sitosterol from leaves (*Indian J. Chem.* 1977, *15*B, 390); echitamine and a new glucoside - venoterpine glucoside - from stem bark (*Indian J. For.* 1978, *1*, 66; *Chem. Abstr.* 1979, *90*, 36288 x).

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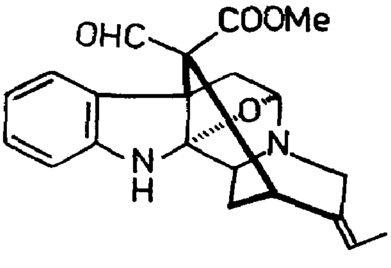
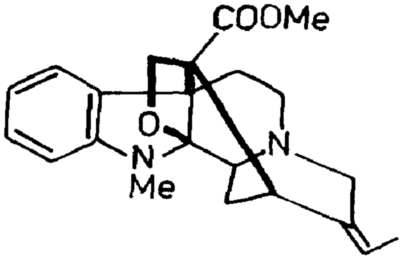
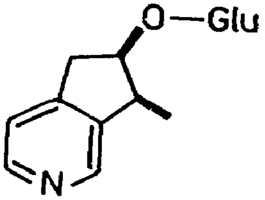


Picralinal



Pseudoakuammigine



Venoterpine glucoside

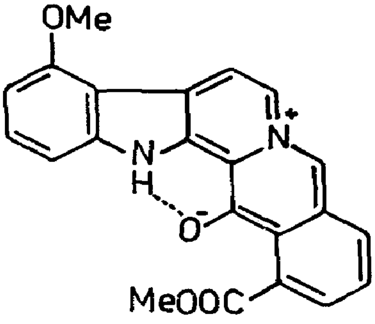
BIOLOGICAL ACTIVITY

Picrinine showed CNS depressant action (*Planta Med.* 1976, *30*, 86).

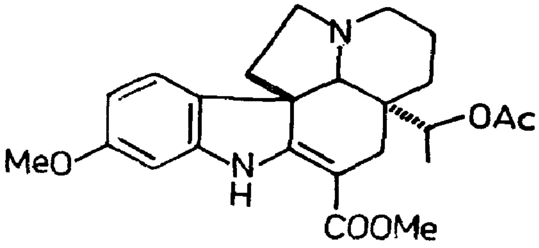
A. venenata R. Br. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 27).

Ursolic acid and β-amyrin from fruits (*Curr. Sci.* 1973, *42*, 606); a quaternary alkaloid - 3-dehydroyohimbine - isolated from bark found identical with 3-dehydroalstovenine (*Experientia* 1973, *29*, 1337); a new alkaloid - echitovenaldine - isolated from leaves and its structure established (*Chem. Ind.* 1973, 1032); structure of a new alkaloid - echitoserpidine - isolated from fruits (*Phytochemistry* 1974, *13*, 645); structure of echitoserpine isolated from fruits (*Tetrahedron* 1974, *30*, 2761); four alkaloids - alstovenine, venenatine, reserpine and 3-dehydroalstovenine - isolated from roots (*Indian J. Chem.* 1975, *13*, 98); a new yohimbinoid alkaloid - anhydroalstonatine - isolated together with trimethylgallamide from bark; its structure proposed (*Indian J. Chem.* 1977, *15*B, 183); β-amyrin acetate and lupeol ester of a β-hydroxy acid isolated from fruit (*Indian J. Pharm. Sci.* 1979, *41*, 125).

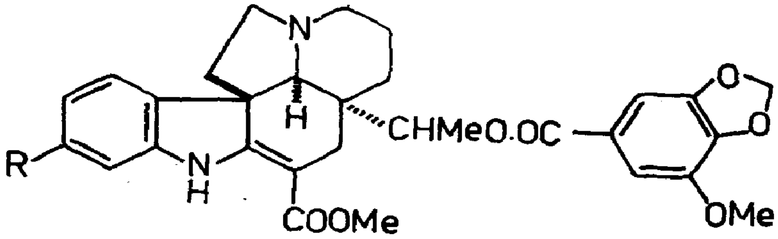
NEW COMPOUNDS



Anhydroalstonatine



Echitovenaldine



Echitoserpidine
R = H
Echitoserpine
R = OMe

ALTERNANTHERA (Amaranthaceae)

A. nodiflora R. Br.; see *A. sessilis* (L.) R. Br. ex DC.

A. paronychioides St.-Hil.; see *A. polygonoides* (L.) R. Br. ex Roem. & Schult.

A. polygonoides (L.) R. Br. ex Roem. & Schult. syn. *A. paronychioides* St.-Hil.
α- And β-spinasterols isolated (*Plant Biochem. J.* 1977, *4*, 14; *Chem. Abstr.* 1977, *87*, 148715 d).
Distribution : Weed, throughout plains of India.

A. pungens H. B. & K. syn. *A. repens* (L.) Link (non Gmel.)
α- And β-spinasterols isolated (*Plant Biochem. J.* 1977, *4*, 14; *Chem. Abstr.* 1977, *87*, 148715 d).
Distribution : Weed, throughout plains of India.

A. repens (L.) Link (non Gmel.); see *A. pungens* H. B. & K.

A. sessilis (L.) R. Br. ex DC. syn. *A. nodiflora* R. Br. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 14).
α- And β-spinasterols isolated (*Plant Biochem. J.* 1977, *4*, 14; *Chem. Abstr.* 1977, *87*, 148715 d); lupeol isolated from roots (*Pol. J. Chem.* 1978, *52*, 2495; *Chem. Abstr.* 1979, *91*, 207443 w).

ALTHAEA (Malvaceae)

A. officinalis L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956. p. 14).
Hemicellulose isolated from plant composed of D-xylose, 4-O-methyl-D-glucuronic acid and traces of L-arabinose and D-galactose (*J. Sci.*, Karachi 1976, *4*, 81; *Chem. Abstr.* 1978, *89*, 56475 p).

A. rosea (L.) Cav. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 28).

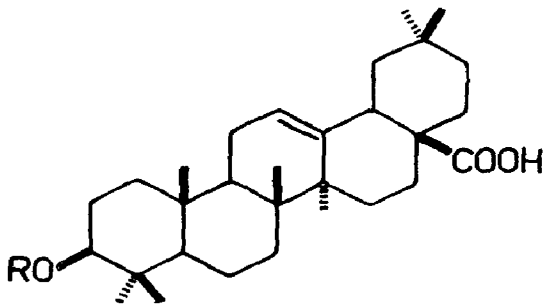
Dioxanelignin yield was 6.2% of plant material and 46.6% of lignin content; p-coumaric, guaiacolic and syringic acid residues identified in dioxanelignin molecule (*Khim. Prir. Soedin.* 1976, *12*, 685; *Chem. Abstr.* 1977, *86*, 117602 q); nudiflorin, identified as apigenin-7-β-(6-β-L-rhamnofuranosido)-D-glucofuranoside, isolated from flowers (*Sb. Nauchn. Tr. Tashk. Gos. Univ. im. V.I. Lenina* 1977, *539*, 12; *Chem. Abstr.* 1979, *91*, 189764 v).

AMARANTHUS (Amaranthaceae)

A. spinosus L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 15).

Hentriacontane and α-spinasterol from leaves and stems; a saponin mixture composed of oleanolic acid, D-glucose and D-glucuronic acid, isolated from roots along with α-spinasterol (*J. Inst. Chemists,* Calcutta 1973, *45*, 205; *Chem. Abstr.* 1974, *81*, 47427 g); β-sitosterol, stigmasterol, campesterol, cholesterol and stearic, oleic and linoleic acids isolated (*Curr. Sci.* 1976, *45*, 481); quercetin and rutin (1.9%) obtained (*Farm. Zh.* 1977, 90; *Chem. Abstr.* 1977, *87*, 197309 h); α-spinasterol octacosanoate and a new saponin - β-D-glucopyranosyl(1→4)-β-D-glucopyranosyl(1→4)-β-D-glucuronopyranosyl(1→3)-oleanolic acid (I) - isolated from roots (*Indian J. Chem.* 1979, *17*B, 180).

NEW COMPOUNDS



I

R = Gluc.acid(4→1)Glu(4→1)Glu

AMMANIA (Lythraceae)

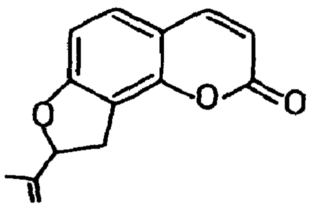
A. floribunda Clarke; see *Rotala floribunda* (Clarke) Koenhe

AMMI (Apiaceae)

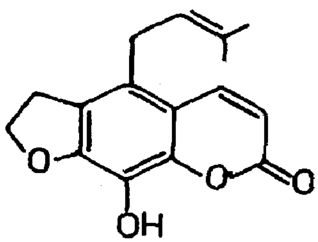
A. majus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 29).

Majurin from fruit (*Tetrahedron Lett.* 1971, 1657); xanthotoxin, imperatorin, bergapten, isopimpinellin and isoimperatorin isolated (*J. Pharm. Sci.* 1971, *60*, 788); a new coumarin - ammirin - isolated from fruit (*Naturwiss.* 1975, *62*, 39; *Chem. Abstr.* 1975, *83*, 4920 m); alloimperatorin from fruit (*Naturwiss.* 1975, *62*, 40; *Chem. Abstr.* 1975, *82*, 135716 b).

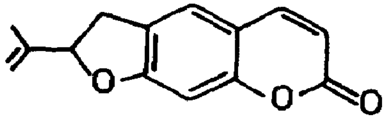
NEW COMPOUNDS



Majurin



Alloimperatorin



Ammirin

A. visnaga (L.) Lam. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 30).

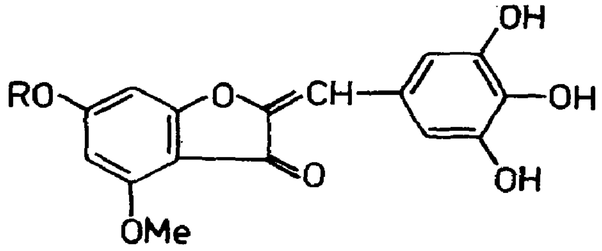
A method for isolation of khellin from fruit (*Res. Ind.* 1977, *22*, 11; *Chem. Abstr.* 1977, *87*, 206414 t).

AMMOMUM (Zingiberaceae)

A. subulatum Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 16).

Petunidin-3,5-diglucoside and leucocyanidin-3-O-β-D-glucopyranoside isolated (*J. Indian Chem. Soc.* 1976, *53*, 633); cardmonin and alpinetin from seeds (*Planta Med.* 1976, *29*, 391); structure of a new aurone glycoside - subulin - isolated from seeds (*Indian J. Chem.* 1977, *15*B, 814).

NEW COMPOUNDS



Subulin

R = Glu(4→1)Rha

A. xanthioides Wall. ex Baker (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 16).

Essential oil contained 1.0% ethyl p-methoxy-transcinnamate (*Tap San, Hoa-Hoc* 1975, *13*, 30; *Chem. Abstr.* 1978, *88*, 65857 w).

AMOORA (Meliaceae)

A. rohituka W. & A.; see *Aphanamixis polystachya* (Wall.) J. N. Parker

AMORPHOPHALLUS (Araceae)

A. campanulatus (Roxb.) Bl. ex Decne. (*Glossary Indian Med. Plants*, Chopra, Nayar, & Chopra, PID, New Delhi, 1956, p. 16).

Betulinic acid, β-sitosterol, its palmitate, stigmasterol, lupeol, triacontane, glucose, galactose, rhamnose and xylose isolated (*Indian J. Pharm.* 1976, *36*, 109).

AMPHICOME (Bignoniaceae)

A. emodi Royle ex Lindl.; see *Incarvillea emodi* (Royle ex Lindl.) Chatterjee

AMYGDALUS (Rosaceae)

A. communis L.; see *Prunus dulcis* (Mill.) D. A. Webb.

ANACARDIUM (Anacardiaceae)

A. occidentale L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 31).

A degraded polysaccharide obtained from cashewnut shell polysaccharide by mild hydrolysis; its proposed structure composed of galactose and galacturonic acid (*Indian J. Chem.* 1973, *11*, 996); p-hydroxybenzoic, protocatechuic, gentisic and gallic acids, along with glucosides, rhamnosides, arabinosides and xylosides of kaempferol and quercitol found in leaves (*Plant. Med. Phytother.* 1977, *11*, 16; *Chem. Abstr.* 1977, *86*, 185967 n); cyanidin, delphinidin, pelargonidin, quercetin, its 3-galactoside, myricetin and gallic acid isolated (*Leather Sci.* 1978, *25*, 51; *Chem. Abstr.* 1978, *89*, 14339 d); naringenin and naringenin-7-O-β-D-(6''-O-p-coumaryl)glucoside (prunin-6''-O-p-coumarate) isolated from defatted nut shells and its structure determined (*Phytochemistry* 1978, *17*, 1064).

ANACYCLUS (Asteraceae)

A. pyrethrum DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 17).

Amides (I, II, III, IV) obtained from roots and their structures determined (*Chem. Ber.* 1972, *105*, 1694).

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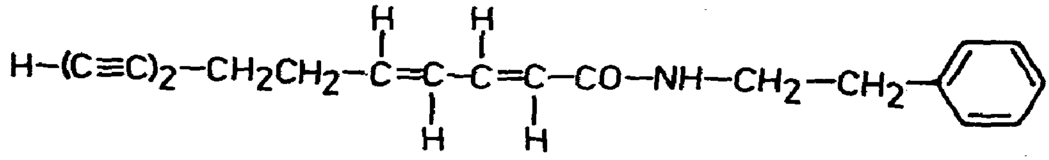
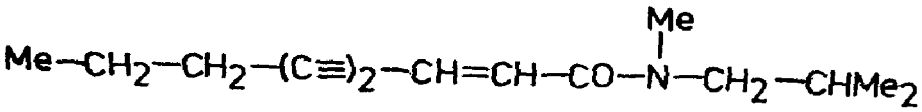


I



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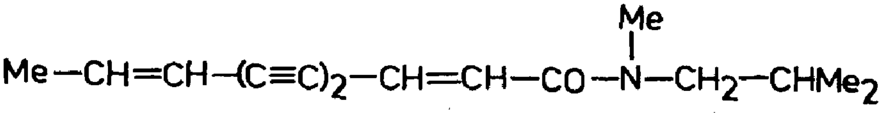

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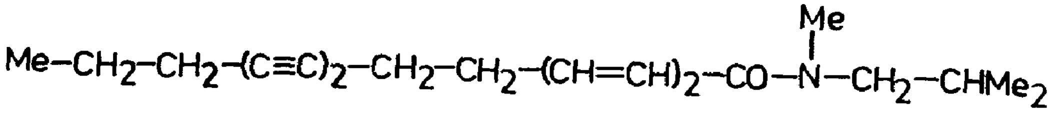

IV

ANAGALLIS (Primulaceae)

A. arvensis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 31).

Structure of anagalligenone B (*Bull. Soc. Chem. Fr.* 1971, 2320); structures of two new cucurbitacin glucosides - arvenin I and arvenin II - isolated together with cucurbitacin E (*Tetrahedron Lett.* 1977, 2099); isolation and identification of cucurbitacins B,D,E,I, L and R (*Phytochemistry* 1978, *17*, 1798; *Chem. Lett.* 1978, 319; *Chem. Abstr.* 1978, *89*, 43842 f); curcurbitacin glucosides - arvenins I, II, III and IV - isolated and their structures established (*Chem. Pharm. Bull.* 1978, *26*, 3107); seed oil contained myristic (5.74), palmitic (31.43), oleic (26.43), linoleic (17.57), linolenic (16.25) and gadoleic acids (2.58%) (*Chem. Era* 1978, *14*, 455; *Chem. Abstr.* 1979, *91*, 87340 m).

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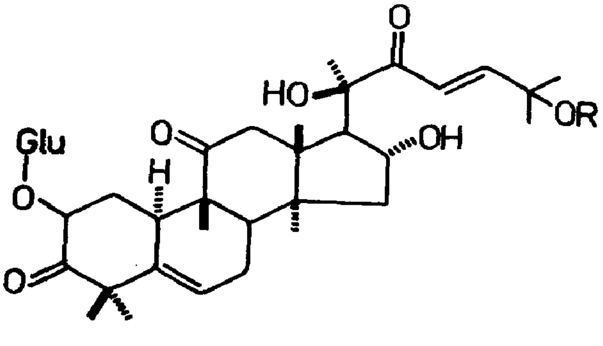
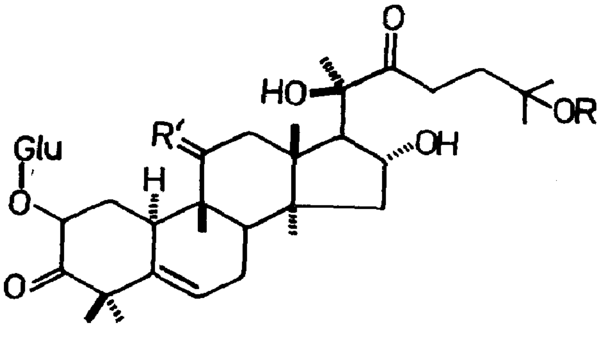
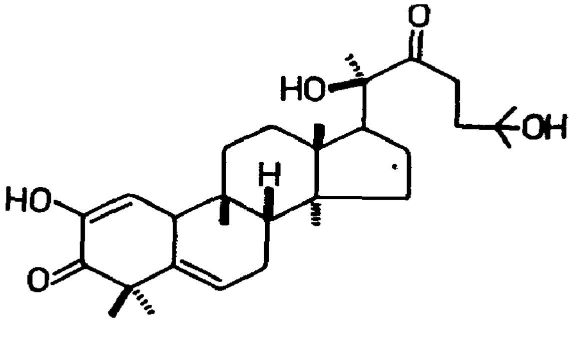


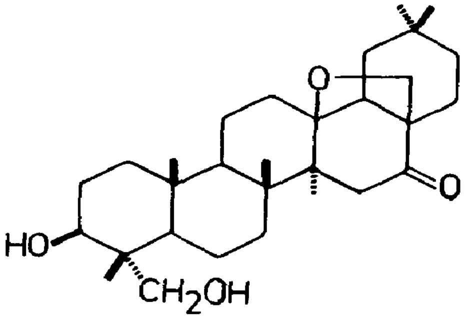
Arvenin I
R = Ac
Arvenin III
R = H



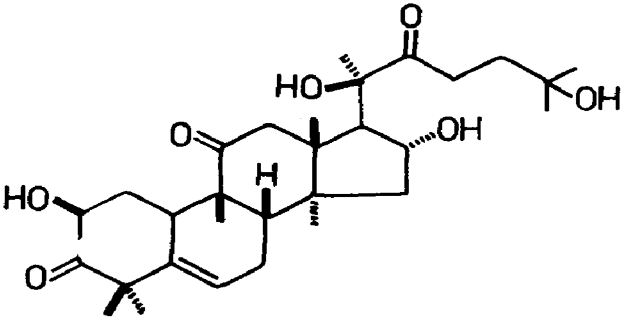
Arvenin II
R = Ac, R' = O
Arvenin IV
R = H, R' = H,H



Cucurbitacin L



Anagalligenone B



Cucurbitacin R

ANANAS (Bromeliaceae)

A. comosus (L.) Merr. syn. *A. sativus* Schult.f. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 17).

Juice of unripe fruits showed marked anti-implantation and abortifacient activities in rats (*Indian J. Med. Res.* 1970, *58*, 1258).

Ergosterol peroxide, 5-stigmastene-3β,7α-diol isolated from leaves besides β-sitosterol, campesterol, stigmastanol and campestanol (*Indian J. Chem.* 1975, *13*, 755); 5-hydroxytryptamine from leaves of crown of pineapple fruit (*Acta Bot. Croat.* 1977, *36*, 83; *Chem. Abstr.* 1978, *88*, 186093 c); method for isolation of biologically active (anti-inflammatory, haemolytic) peptides from roots and juice (Jpn. 7891,107, (1978) Aug. 10; *Chem. Abstr.* 1978, *89*, 169088 h).

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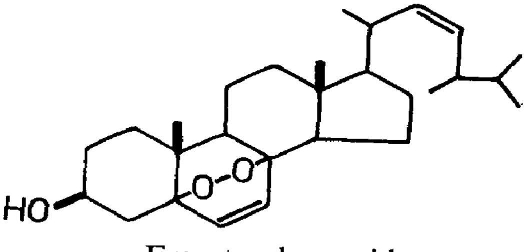

Ergosterol peroxide

A. sativus Schul. f.; see *A. comosus* (L.) Merr.

ANAPHALIS (Asteraceae)

A. adnata DC.

Structure of a new kawapyrone - 4′-hydroxydehydrokawain (I) (*Indian J. Chem.* 1976, *14*B, 300)

Distribution : Himalayas from Himachal Pradesh to Bhutan, alt. 1800-2400 m and Khasia Hills, alt, 1200-1800 m.

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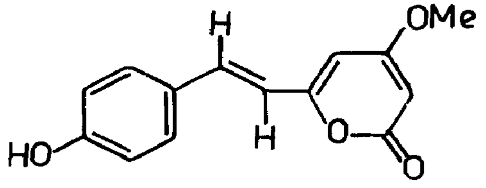

I

A. araneosa DC.; see *A. busua* (D. Don) DC.

A. busua (D. Don) DC. syn. *A. araneosa* DC.

Structures of twc .ew flavonoids - araneol and araneosol - elucidated (*Phytochemistry* 1979, *18*, 356).

Distribution : Himalayas from Kashmir to Sikkim, alt. 1500-2400 m and Meghalaya, alt. 1200-2000 m.

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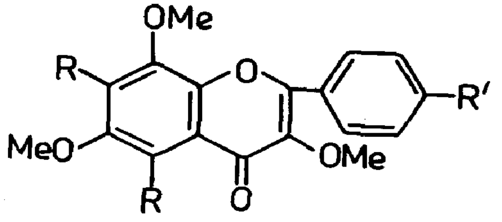

Araneol
R = OH, R′ = H
Araneosol
R = H, R′ = OMe

A. contorta (D. Don) Hook.f.

Fungicidal activity was found in oil (*Indian Perfum.* 1977, *22*, 129; *Chem. Abstr.* 1978, *89*, 152564 n).

A new glycoside - tiliroside - isolated from flowers and characterised as kaempferol-3-β-D-(6′′-O-p-coumaroyl)glucoside (*J. Chinese Chem. Soc.* 1975, *22*, 383; *Chem. Abstr.* 1976, *84*, 147653 h; (*J. Chinese Chem. Soc.* 1976, *23*, 57; *Chem. Abstr.* 1976, *85*, 10346 m); 1,8-cineole

and d-limonene as major components of oil (*Indian Perfum.* 1977, *22*, 129; *Chem. Abstr.* 1978, *89*, 152564 n).

Distribution : Himalayas from Kashmir to Sikkim, alt. 2000-4000 m and Meghalaya, alt. 1200-2000 m.

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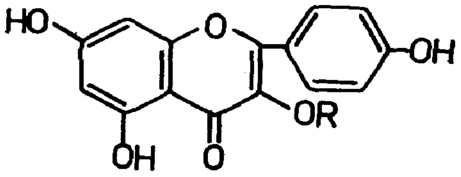

Tiliroside
R = Glu(6''-p-coumaroyl)

ANCISTROCLADUS (Ancistrocladaceae)

A. heyneanus Wall. ex DC.

Isolation and structure of a new isoquinoline alkaloid - ancistrocladine (*Indian J. Chem.* 1970, *8*, 567; *ibid.* 1971, *9*, 931; *Tetrahedron* 1971, *27*, 1013); minor alkaloid - ancistrocladinine - isolated from roots and characterised (*Indian J. Chem.* 1971, *9*, 1421); isolation and structure of another alkaloid - ancistrocladisine, mp. 178° - from roots (*Indian J. Chem.* 1972, *10*, 1117); isolation and structure of another new alkaloid - ancistrocladidine - from roots (*Indian J. Chem.* 1973, *11*, 1190).

Distribution : Western Ghats, in evergreen forests.

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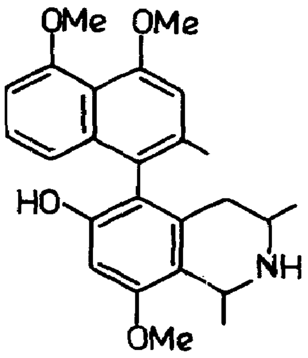
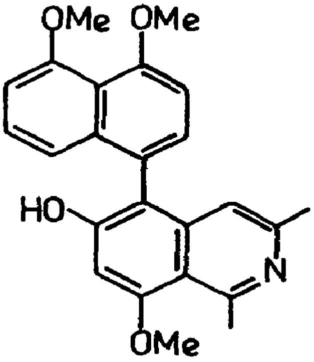
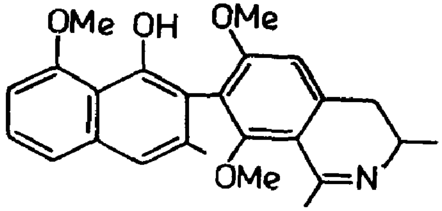


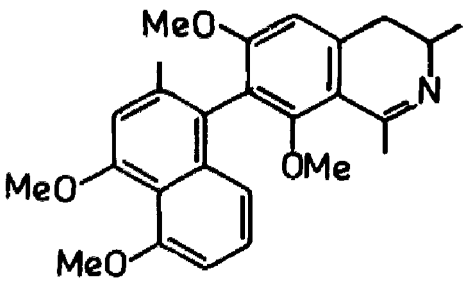
Ancistrocladine



Ancistrocladinine



Ancistrocladidine



Ancistrocladisine

ANDRACHNE (Euphorbiaceae)

A. rotundifolia C.A. Mayer; see *A. telephioides* L.

A. telephioides L. syn. *A. rotundifolia* C.A. Mayer (*Compend. Indian Med. Plants*, Vol. 1 Rastogi & Mehrotra, PID, New Delhi, 1990, p. 32).

β-Sitosterol, octacosane, pentatriacontane, hexacosanol and dotriacontanol from aerial parts (*Khim. Prir. Soedin.* 1974, *10*, 80; *Chem. Abstr.* 1974, *81*, 60804 x).

ANDROGRAPHIS (Acanthaceae)

A. paniculata (Burm.) Wall. ex Nees (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 33).

Neither leaf and stem extract of kalmegh administered orally nor andrographolide given s.c. or orally changed blood sugar level of normal or diabetic rats (*Bangladesh Pharm. J.* 1977, *6*, 21; *Chem. Abstr.* 1978, *88*, 315 y); kalmegh increased biliary flow and liver weight in rat and decreased hexobarbital-induced sleeping time. It was less potent than phenobarbital (*Indian J. Exp. Biol.* 1978, *16*, 830).

Stereostructure of a diterpene glucoside - neoandrographolide (*Tetrahedron* 1971, *27*, 5081); 14-deoxy-11-oxoandrographolide, 14-deoxy-11,12-didehydroandrographolide and 14-deoxyandrographolide isolated and characterised (*J. Chem. Soc.*-Perkin 1 1973, 1247); a crystalline mixture of four bitter substances isolated from leaves (*Acta Pharm.* 1973, *4*, 36; *Chem. Abstr.* 1973, *79*, 118269 d); andrographin, panicolin, apigenin 4,7-dimethyl ether and mono-O-methylwithin from roots (*Pakistan J. Sci. Ind. Res.* 1972, *15*, 33; *Chem. Abstr.* 1973, *78*, 43200 t); caffeic, chlorogenic and dicaffeoylquinic acids isolated from leaves (*Leather. Sci.* 1978, *25*, 250; *Chem. Abstr.* 1979, *90*, 83620 j).

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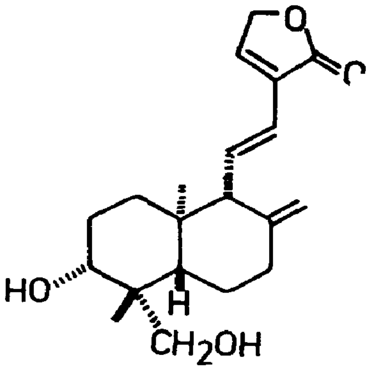
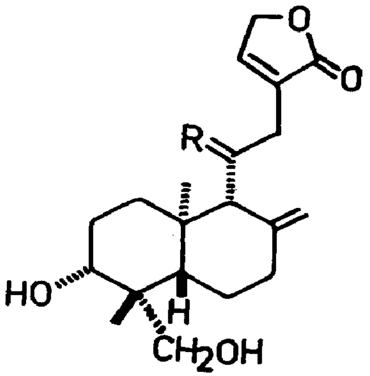


14-Deoxy-11,12-didehydroandrographolide



14-Deoxyandrographolide
R = H,H
14-Deoxy-11-oxoandrographolide
R = O

A. wightiana Arn. ex Nees (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 34).

Crystal structure of wightionolide determined (*J. Chem. Soc.* Perkin 1 1974, 2517).

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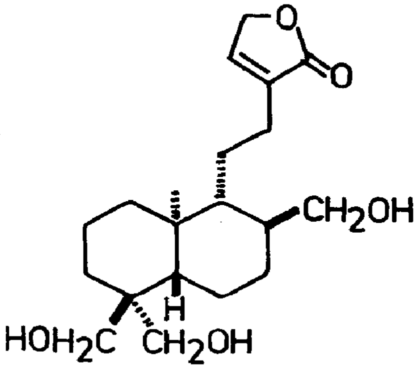

Wightionolide

ANDROPOGON (Poaceae)

A. citratus DC.; see *Cymbopogon citratus* (DC.) Stapf

A. distans Nees ex Steud.; see *Cymbopogon distans* (Nees ex Steud.) Wats.

A. hallii Hack.

Leaf waxes contain β-diketones mainly tritriacontane-12,14-dione, hentriacontane-12,14-dione in the ratio of 86:8 and hydroxyβ-diketones mainly 5-hydroxytritriacontane-12,14-dione and 5-hydroxyhentriacontane-12,14-dione in the ratio of 90:8 (*Phytochemistry* 1979, *18*, 267).

Distribution : Introduced into India.

A. jwarancusa Jones; see *Cymbopogon jwarancusa* (Jones) Schult.

A. nardus L.; see *Cymbopogon nardus* (L.) Rendle

A. nardus L. var. *flexuosus* (Nees ex Steud.) Hack.; see *Cymbopogon flexuosus* (Nees ex Steud.) Wats.

A. nardus L. var. *stracheyi* Hook.f.; see *Cymbopogon pospischilii* (K. Schum.) Habbard

A. pendulus Nees ex Steud.; see *Cymbopogon pendulus* (Nees ex Steud.) Wats.

A. schoenanthus L. var. *gracillimus* Hook.f.; see *Cymbopogon caesius* (Nees) Stapf

A. sorghum Brot.; see *Sorghum bicolor* (L.) Moench

A. squarrosus Hook.f.; see *Vetiveria zizanioides* (L.) Nash

ANDROSACE (Primulaceae)

A. rotundifolia Hardw. syn. *A. rotundifolia* Hardw. var. *stracheyi* Watt.
Primulagenin A identified in saponin fraction (*Lloydia* 1978, *41*, 281).
Distribution : Himalayas from Kashmir to Kumaon, alt. 1600-3800 m.

A. rotundifolia Hardw. var. *stracheyi* Watt.; see *A. rotundifolia* Hardw.

ANEMARRHENA (Liliaceae)

A. asphodeloids Bunge (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 34).
A xanthone C-glucoside - isomangiferin - isolated from aerial parts (*Chem. Pharm. Bull.* 1970, *18*, 2327).

ANEMONE (Ranunculaceae)

A. biflora DC.; see *A. coronaria* L. var. *biflora* Finet & Gagnep

A. coronaria L. var. *biflora* Finet & Gagnep syn. *A. biflora* DC.
Sitosterol was isolated (*Indian J. Chem.* 1976, *14*B, 475).
Distribution : Kashmir, alt. 1700-1900 m.

A. rivularis Buch.-Ham. ex DC.
Betulinic acid isolated (*Proc. Nat. Acad. Sci.* India 1975, *45*A, 300; *Chem. Abstr.* 1977, *87*, 148711z); structure of a new saponin - rivularinin - elucidated (*Phytochemistry* 1978, *17*, 199).
Distribution : Throughout Himalayas, temperate region above 1500 m.

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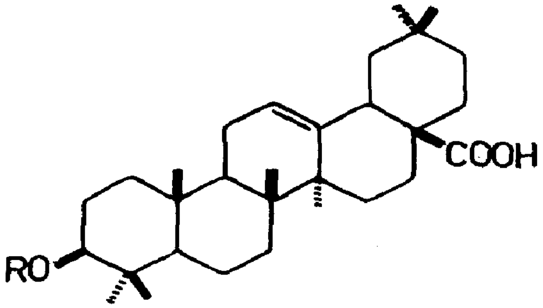

Rivularinin
R = Gluc.acid(4→1)Glu(4→1)Rha(2→1)Ara

ANISEIA (Convolvulaceae)

A. martinicensis (Jacq.) Choisy syn. *Ipomoea uniflora* (Burm.f.) Roem. & Schult. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 143).

Total alkaloids in seeds 0.005%, ergoline and clavine alkaloids present (*Indian J. Pharm.* 1974, *36*, 44).

ANETHUM (Apiaceae)

A. graveolens L. syn. *A. sowa* Roxb. ex Flem., *Peucedanum graveolens* (L.) Benth. & Hook.f., *P. sowa* Kurz (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 35).

Tripetroselinin, petroselinicdiolein and dipetroselinicolein from seed oil (*Biochem. Appl.* 1969, *16*, 167; *Chem. Abstr.* 1970, *73*, 84600 p); vicenin (6,8-di-C-glucosyl-5,7,3'-trihydroxyflavone) from fruits (*Khim. Prir. Soedin.* 1970, *6*, 268; *Chem. Abstr.* 1970, *73*, 84627 c); detection of α-pinene, d-limonene, d-phellandrene, α-terpinene, carvone, caryophyllene, myristicin and eugenol in essential oil (*Flavour Ind.* 1971, *2*, 363; *Chem. Abstr.* 1971, *75*, 143902 e; *Pakistan J. Sci. Ind. Res.* 1977, *20*, 52; *Chem. Abstr.* 1979, *90*, 121813 j); in addition, essential oil also contained α-phellandrene, dihydrocarvone, carvacrol, dillapiol, safrole and thymol (*Riechst. Aromen, Koerperpflegem.* 1972, *22*, 200; *Chem. Abstr.* 1972, *77*, 85546 v); glyceryl esters of saturated and unsaturated fatty acids, a polyene - phytofluene-, β-sitosterol, umbelliferone, scopoletin, stigmasterol and osthole from roots (*Sci. Pharm.* 1973, *41*, 102; *Chem. Abstr.* 1973, *79*, 75880 b); a new xanthone glycoside - dillanoside - from fruit (*Chem. Pharm. Bull.* 1976, *24*, 220); synthesis of a benzodipyran - graveolone - isolated from plant (*Indian J. Chem.* 1978, *16*B, 570).

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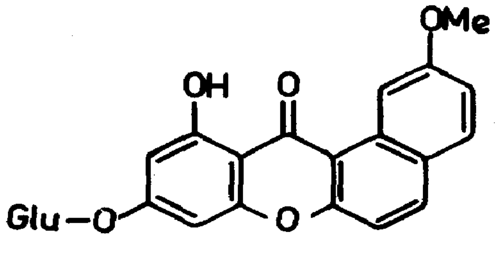
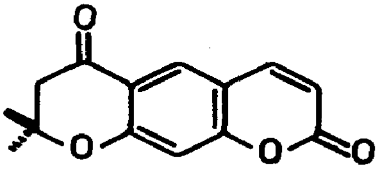


Dillanoside



Graveolone

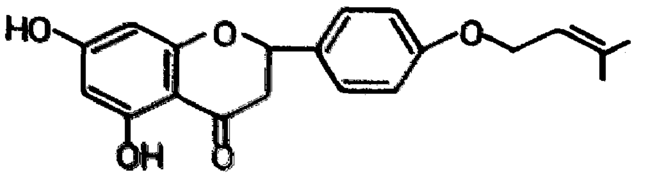
A. sowa Roxb. ex Flem.; see *A. graveolens* L.

ANGELICA (Apiaceae)

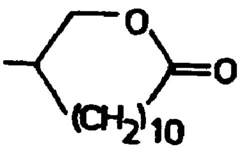
A. archangelica L. syn. *Archangelica officinalis* (Moench) Hoffm. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi and Mehrotra, PID, New Delhi, 1990, p. 36).

Isolation and structure of a new flavanone - archangelenone - from roots (*Chem. Ind.* 1971, 355; *Indian J. Chem.* 1973, *11*, 407); structure of archangelin revised and confirmed by synthesis (*Tetrahedron Lett.* 1972, 3811); revised structure of angelicain (*Indian J. Chem.* 1973, *11*, 505); a new macrocyclic lactone - 12-methyl-ω-tridecanolide (I) - from root oil (*Acta Chem. Scand.* 1975, *29*, 637); determination of limonene (22.7), α-phellandrene (22.5%) in root oil; α-phellandrene (67.8) in leaf oil and cineole (53.8%) in fruit oil as main compounds by chromatographic analysis (*Farm. Pol.* 1976, *32*, 833; *Chem. Abstr.* 1977, *86*, 177151 b); imperatorin, isoimperatorin, bergapten, isopimpinellin and 8-hydroxy-5-methoxypsoralen along with acetates of lupeol and α-amyrin isolated from fruits (*Indian J. Chem.* 1976, *14*B, 816); root extract showed presence of lauric, tridecanoic, myristic, pentadecanoic, palmitic, palmitoleic, stearic, oleic, linoleic and linolenic acids (*Khim. Prir. Soedin.* 1977, *13*, 108; *Chem. Abstr.* 1977, *87*, 50189 k); out of seventeen compounds found in fruits, imperatorin, bergapten, xanthotoxol, xanthotoxin and isopimpinellin isolated and identified (*Ann. Univ. Mariae Curie-Sklodowska* 1976, *31*D, 349; *Chem. Abstr.* 1978, *89*, 72952 x); petroselinic, linoleic, stearic, palmitic acids (42.98, 49.35, 1.15 and 4.54% respectively), lauric, myristic, palmitoleic, arachidic, eicosanoic acids (1.0%), β-sitosterol and stigmasterol from fruits (*Acta Pol. Pharm.* 1978, *35*, 353; *Chem. Abstr.* 1979, *90*, 36301 w); detection of α-pinene, β-pinene in roots, caryophyllene in stem, α-pinene, β-pinene and β-phellandrene in leaves and β-phellandrene in flower and fruit essential oils by TLC and GLC (*Rev. Med.* 1978, *24*, 10; *Chem. Abstr.* 1979, *90*, 142058 g).

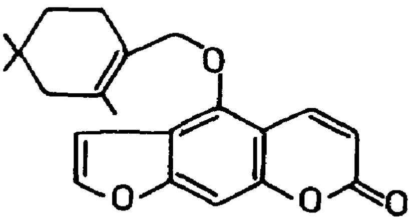
NEW COMPOUNDS



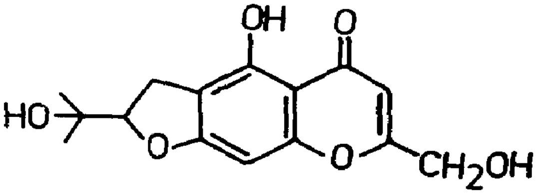
Archangelenone



I



Archangelin

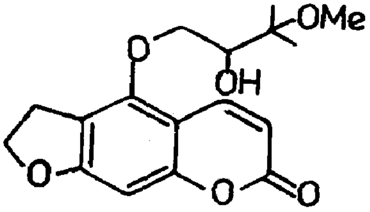


Angelicain

A. glauca Edgew. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 36).

Isoimperatorin, prangolarin and a new coumarin (I) isolated (*Phytochemistry* 1972, *11*, 475).

NEW COMPOUNDS



I

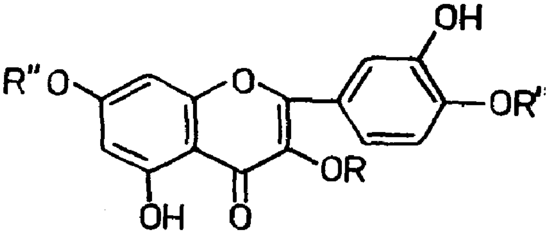
ANGELONIA (Scrophulariaceae)

A. grandiflora C. Morr.

Five rare methylated flavonols (I, II, III, IV and V) isolated from leaves and their structures determined (*Phytochemistry* 1978, *17*, 591).

Distribution : Native of Brazil, introduced into India and naturalised in Karnataka and Kerala.

NEW COMPOUNDS



I

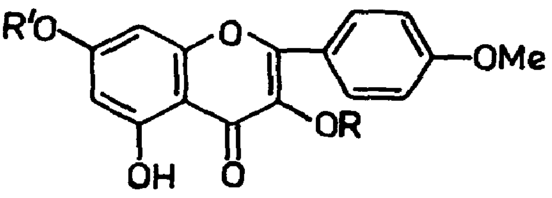
R,R' = Me, R'' = H

II

R,R'' = Me, R' = H

III

R = H, R',R'' = Me



IV

R = Me, R' = H

V

R = H, R' = Me

ANGIOPTERIS (Angiopteridaceae)

A. evecta (Forst.) Hoffm.

Violanthin and isoviolanthin from leaves (*Phytochemistry* 1979, *18*, 1077).

Distribution : Throughout hilly regions of India.

ANISOCHILUS (Lamiaceae)

A. carnosus (L.f.) Wall. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 19).

Diosmetin and diosmin isolated (*Phytochemistry* 1972, *11*, 452).

ANISOMELES (Lamiaceae)

A. heyneana Benth.

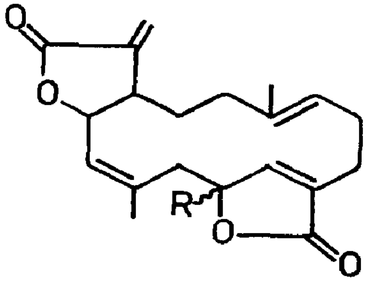
Sitosterol was isolated (*Indian J. Chem.* 1977, *15*B, 291).

Distribution : Western Ghats, from Konkan southwards.

A. indica (L.) Kuntze syn. *A. ovata* R. Br. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 36).

Cerotic, pentacosanoic, lignoceric, tricosanoic, behenic, heneicosanoic, arachic, stearic and palmitic acids isolated from roots (*Taiwan Yao Hsueh Tsa Chih* 1975, *27*, 86; *Chem. Abstr.* 1977, *86*, 2376 b); stereostructures of macrocyclic diterpenoids - ovatodiolide and iso-ovatodiolide - established by X-ray analysis (*J. Org. Chem.* 1977, *42*, 3824).

NEW COMPOUNDS



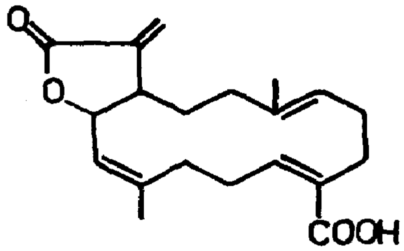
Ovatodiolide
R = β-H
Iso-ovatodiolide
R = α-H

A. malabarica (L.) R. Br. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 19).

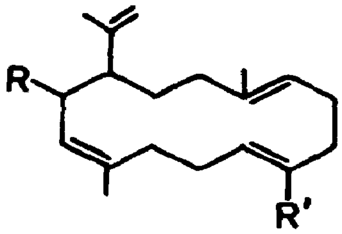
Ovatodiolide and anisomelic acid (anisomelolide) isolated (*Indian J. Chem.* 1975, *13*, 1357); new macrocyclic diterpenes - malabaric acid, 2-acetoxymalabaric acid, anisomelyl acetate and anisomellol - along with anisomelolide and ovatodiolide isolated and their structures determined (*Indian J. Chem.* 1978, *16*B, 441); anisomelin, mp. 199°, isolated and identified as

cirsilineol (*Indian J. Chem.* 1979, *17B*, 84).

NEW COMPOUNDS



Anisomelolide



Malabaric acid
R = H, R' = COOH
2-Acetoxymalabaric acid
R = OAc, R' = COOH
Anisomelyl acetate
R = H, R' = CH_2OAC
Anisomellol
R = H, R' = CH_2OH

A. ovata R. Br.; see *A. indica* (L.) Kuntze

ANNONA (Annonaceae)

A. muricata L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 19).

Galactomannan from seeds has main chain of (1→4) linked mannose residues with side chains of single galactose residues linked to main chain by (1→6) bonds (*Carbohydr. Res.* 1971, *20*, 329; *Chem. Abstr.* 1972, *76*, 32247 w).

A. reticulata L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 19).

Anonaine, michelalbine, oxoushinsunine and reticuline isolated along with an unknown phenolic base from root bark (*Pei I Hsueh Pao* 1973, 130; *Chem. Abstr.* 1974, *81*, 60846 n).

BIOLOGICAL ACTIVITY

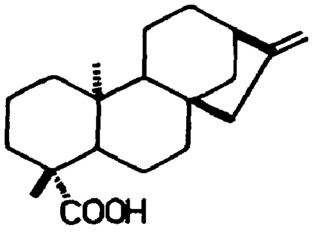
Anonaine showed hypotensive activity in mice and rabbits (*Farmakol. Alkaloidov Serdech. Glikozidov* 1971, 207; *Chem. Abstr.* 1972, *77*, 109453 r).

A. squamosa L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 20).

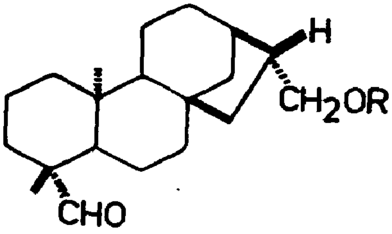
A kaurane diterpenoid - (-)kaur-11-en-19-oic acid (I), mp. 175° - isolated; (*Taiwan Yao Hsueh Tsa Chih* 1971, *23*, 8; *Chem. Abstr.* 1974, *80*, 68394 p); aporphine alkaloids - anonaine, roemerine, norcorydine, corydine, norisocorydine, isocorydine and glaucine - isolated (*Phytochemistry* 1972, *11*, 1819); besides β-caryophyllene, five new diterpenes (II,III,IV,V and VI) isolated and their structures elucidated as kauren-19-ol, kauren-19-yl ace'ate, kauren-

19-al,17-hydroxy-kauran-19-al and 17-acetoxy-kauran-19-al (*Chem. Ber.* 1973, *106*, 841); *β*-sitosterol, corydine, isocorydine, anonaine, glaucine, borneol, camphor and a new monoterpene, mp. 176°, isolated from root and bark (*Indian J. Pharm. Sci.* 1978, *40*, 170).

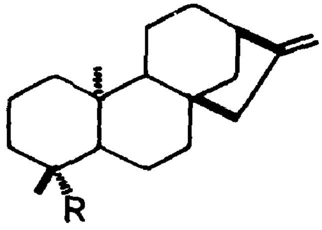
NEW COMPOUNDS



I



II
R = H
VI
R = Ac



III
R = CH_2OH
IV
R = CHO
V
R = CH_2OAc

BIOLOGICAL ACTIVITY

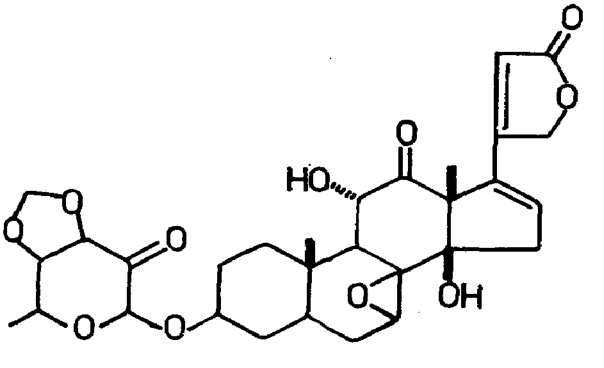
(-)Kaur-11-en-19-oic acid showed plant growth regulator (gibberellin-like) activity (*Taiwan Yao Hseuh Tsa Chih* 1971, *23*, 8; *Chem. Abstr.* 1974, *80*, 68394 p). The monoterpene, mp. 176°, showed relaxant activity in frog rectus abdominis muscle. It also had laxative action in human volunteers administered 10 mg dose orally (*Indian J. Pharm. Sci.* 1978, *40*, 170).

ANODENDRON (Apocynaceae)

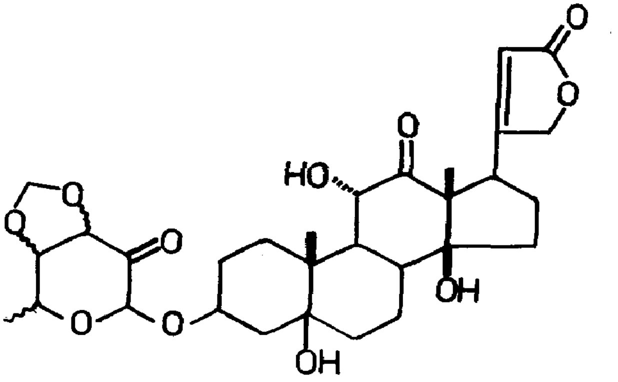
A. paniculatum (Roxb.) DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 20).

Anodendrosides A, E_1, E_2, F and G isolated and characterised (*Helv. Chim. Acta* 1972, *55*, 1696).

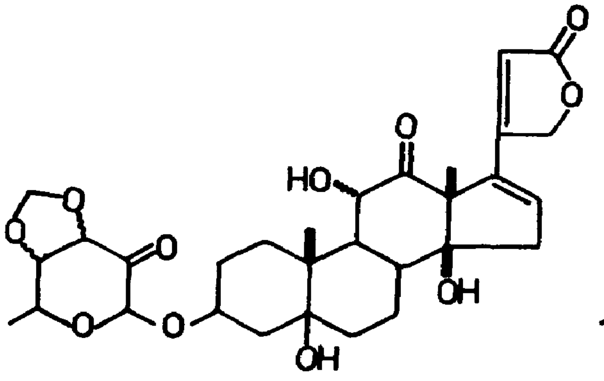
NEW COMPOUNDS



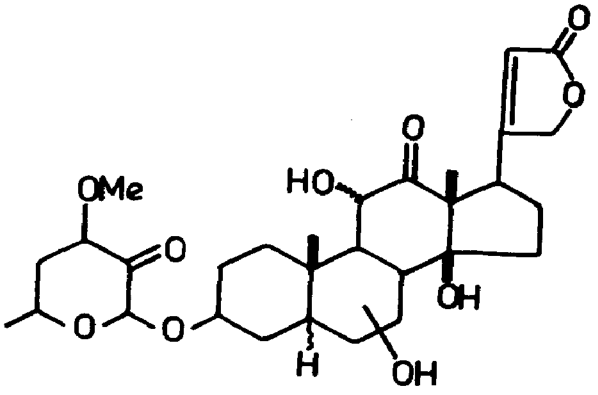
Anodendroside A



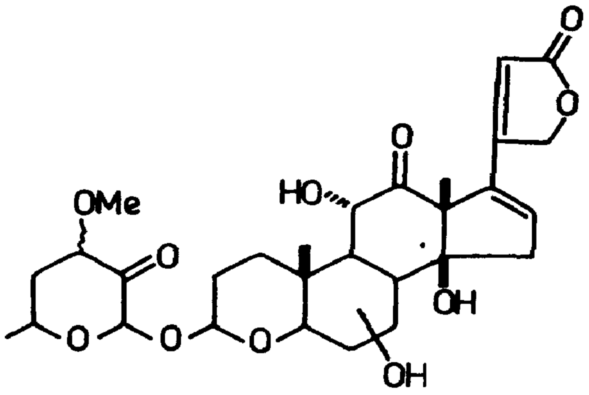
Anodendroside E_1



Anodendroside E2



Anodendroside F



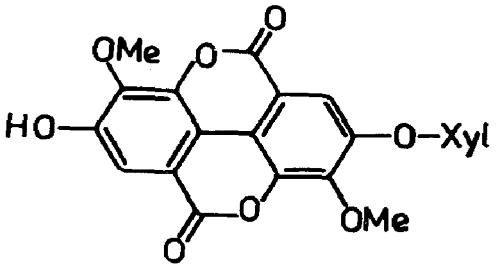
Anodendroside G

ANOGEISSUS (Combretaceae)

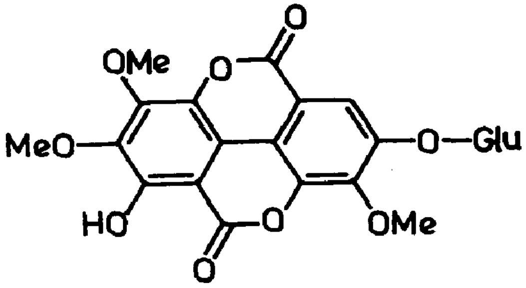
A. latifolia Wall. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 20).

3,3'-Di-O-methylellagic acid-4'-β-D-xyloside (I) and 3,4,3'-tri-O-methylflavellagic acid-4'-β-D-glucoside (II) isolated from bark and characterised (*Indian J. Chem.* 1976, *14*B, 641).

NEW COMPOUNDS



I



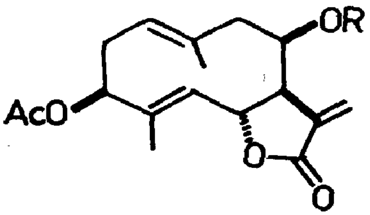
II

ANTHEMIS (Asteraceae)

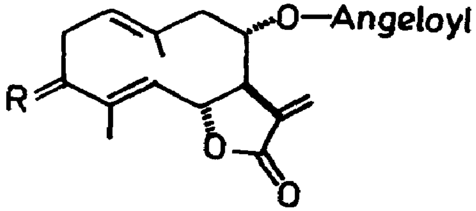
A. nobilis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 37).

Detection of cadinene, β-farnesene, chamazulene and 1-α-bisabolol by TLC and GLC (*Mezhdunar. Kongr. Efirnym Maslam 4th*, 1968, 351; *Chem. Abstr.* 1973, *79*, 83385 j); apigenin, its 7-glucoside, apiin, luteolin, its 7-glucoside, kaempferol, scopoletin, β-sitosterol and hexacosanol isolated from Egyptian plant (*Qual. Plant. Mater. Veg.* 1973, *22*, 141; *Chem. Abstr.* 1973, *79*, 39991 e); detection of anthemoside, cosmioside, apigenin-7-glucoside and traces of luteolin-7-glucoside in white variety of flower (Roman camomille) by PC (*Plant. Med. Phytother.* 1973, *7*, 234; *Chem. Abstr.* 1974, *81*, 1257 y); detection of α- and β-pinene, β-myrcene, limonene, camphene and sabinene in flower oil by GLC (*Essenze Deriv. Agrum.* 1973, *43*, 107; *Chem. Abstr.* 1974, *80*, 143045 f); out of thirty components shown in volatile oil (0.7%) by GC, ten corresponded to butanol, isoamyl alcohol, isobutyric acid, butyric acid, α-pinene (2.36%), angelic acid, isoamyl angelate, isoamyl tiglate, nerolidol (0.13%) and farnesol (2.28%) (*Egypt. J. Pharm. Sci.* 1975, *16*, 161; *Chem. Abstr.* 1977, *86*, 167935 w); isolation and structure of 3-epinobilin, 1,10-epoxynobilin and 3-dehydronobilin from flowers; revision of structure of nobilin and eucannabinolide (*Collect. Czech. Chem. Commun.* 1977, *42*, 1053); structure of a sesquiterpenic lactone - hydroxyisonobilin - isolated from leaves (*Collect. Czech. Chem. Commun.* 1977, *42*, 1065); a new sesquiterpenic lactone isolated (*Pol. J. Pharmacol. Pharm.* 1977, *29*, 419; *Chem. Abstr.* 1978, *88*, 94725 g).

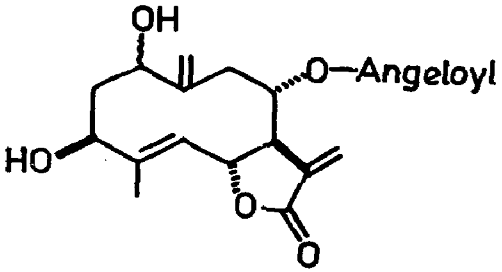
NEW COMPOUNDS



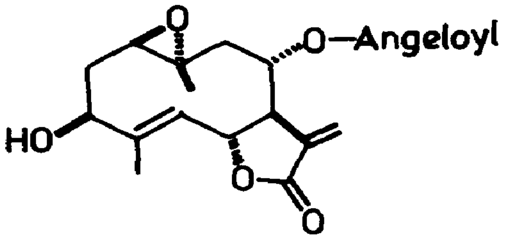
Eucannabinolide
R = $COC(CH_2OH){=}CHCH_2OH$



Nobilin
R = β-OH
3-Epinobilin
R = α-OH
3-Dehydronobilin
R = O



Hydroxyisonobilin



1,10-Epoxynobilin

BIOLOGICAL ACTIVITY

Nobilin, hydroxynobilin, 1,10-epoxynobilin and 3-dehydronobilin *in vitro* inhibited human tumor cells of carcinoma cervicis uteri (HeLa) and nasopharynx carcinoma (*Collect. Czech. Chem. Commun.* 1977, *42*, 1053, 1065); a new sesquiterpene lactone showed cytotoxic activity against HeLa cells (ED50 1.5 μM) and KB cells (ED50 3.5 μM) (*Pol. J. Pharmacol. Pharm.* 1977, *29*, 419; *Chem. Abstr.* 1978, *88*, 94725 g).

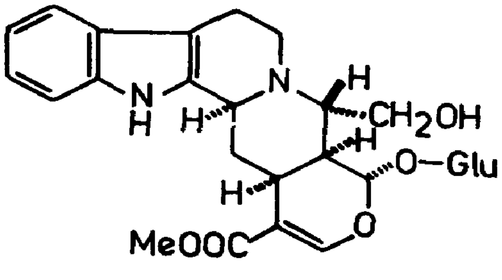
ANTHOCEPHALUS (Rubiaceae)

A. cadamba (Roxb.) Miq.; see *A. chinensis* (Lamk.) A. Rich. ex Walp.

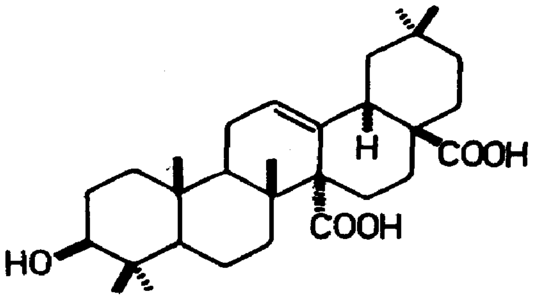
A. chinensis (Lamk.) A. Rich. ex Walp. syn. *A. cadamba* (Roxb.) Miq., *A. indicus* A. Rich. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 20).

Isolation and structure of cadambine and 3α-dihydrocadambine (*Tetrahedron Lett.* 1974, 1957); a glycosidic alkaloid - isodihydrocadambine - isolated and characterised (*Tetrahedron Lett.* 1974, 3335); a new triterpenic acid - cadambagenic and - along with quinovic acid and β-sitosterol isolated (*Indian J. Chem.* 1974, *12*, 284); cadambine, 3α-isodihydrocadambine, 3α-dihydrocadambine, 3β-dihydrocadambine and 3β-isodihydrocadambine isolated as acetates from leaves (*Tetrahedron Lett.* 1976, 2723); a new saponin - saponin B - isolated from stem bark and characterised as α-L-rhamnopyranosyl-(1→2)-α-L-rhamnopyranosyl-(1→3)-α-L-fucopyranosyl-(1→3)-cadambagenic acid (*Indian J. Chem.* 1977, *15B*, 654); two new saponins C and D isolated from stem bark and characterised as β-D-glucopyranosyl (1→4)-β-D-glucopyranosyl(1→3)-α-L-fucopyranosyl(1→3) quinovic acid and α-L-rhamnopyranosyl(1→4)-β-D-glucopyranosyl(1→2)-β-D-glucopyranosyl(1→4)α-L-fucopyranosyl (1→3)quinovic acid respectively (*J. Indian Chem. Soc.* 1978, *55*, 275).

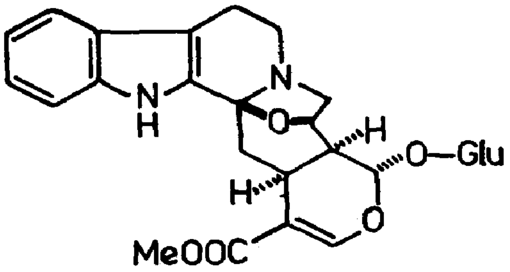
NEW COMPOUNDS



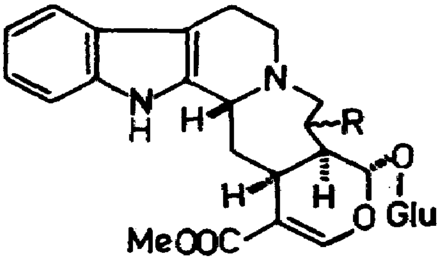
Isodihyrocadambine



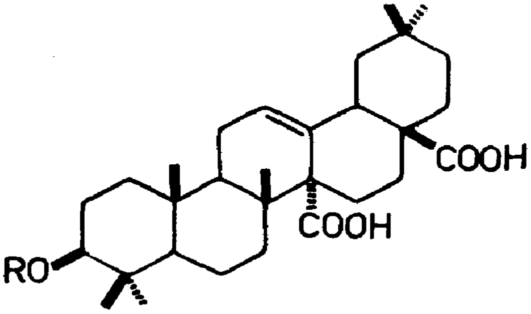
Cadambagenic acid



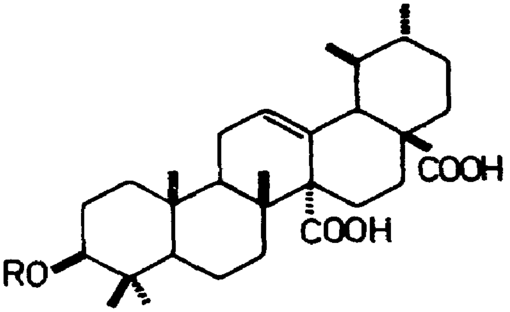
Cadambine



3β-Dihydrocadambine
R = β-OH
3α-Dihydrocadambine
R = α-OH



Saponin B
R = Fuc(3→1)Rha(2→1)Rha



Saponin C
R = Fuc(3→1)Glu(4→1)Glu
Saponin D
R = Fuc(4→1)Glu(2→1)Glu(4→1)Rha

A. indicus A. Rich.; see *A. chinensis* (Lamk.) A. Rich. ex Walp.

ANTIDESMA (Euphorbiaceae)

A. acidum Retz. syn. *A. diandrum* Retz., *A. diandrum* (Roxb.) Roth, *A. ghaesembilla* sensu Hook.f. p.p.

Sitosterol from trunk (*Phytochemistry* 1973, *12*, 1819).

Distribution : Throughout plains of India, ascending to 1600 m in hills.

A. diandrum Retz.; see *A. acidum* Retz.

A. diandrum (Roxb.) Roth; see *A. acidum* Retz.

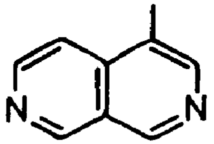
A. ghaesembilla Hook.f.; see *A. acidum* Retz.

ANTIRRHINUM (Scrophulariaceae)

A. majus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 39).

A new alkaloid - 4-methyl-2,6-naphthyridine (I) - along with three other tertiary alkaloids isolated from aerial parts (*Tetrahedron Lett.* 1970, 4773; *Planta Med.* 1971, *20*, 108); cyanidin-3-glucoside and cyanidin-3-rutinoside from flowers (*Phytochemistry* 1971, *10*, 2848); out of sixteen amino acids isolated from aerial parts, eleven identified as alanine, aspartic acid, cysteine, glutamic acid, glutamine, glycine, lysine, serine, threonine, tyrosine and valine; presence of α-aminobutyric acid, proline, hydroxyproline, tryptophan and leucine detected by TLC and GC (*Planta Med.* 1976, *30*, 317).

NEW COMPOUNDS



I

BIOLOGICAL ACTIVITY

Luteolin showed marked antiulcer action when given orally to guinea pigs at 10 mg/kg/day during 5 days of histamine treatment or to rats for 12 days preceding pyloric ligation. Under same conditions, apigenin was much less effective (*Minerva Med.* 1972, *63*, 1665; *Chem. Abstr.* 1972, *77*, 96754 n).

A. orontium L.

4-Methyl-2,6-naphthyridine and choline chloride from aerial parts (*Phytochemistry* 1971, *10*, 2849); presence of aurone glycosides - aurensin and bracteatin-6-glucoside - confirmed (*Phytochemistry* 1975, *14*, 1461).

Distribution : Punjab plains and western Himalayas, ascending to 1200 m.

APAMA (Aristolochiaceae)

A. barberi Gamble

Stigmasterol from stems (*Indian J. Chem.* 1977, *15*B, 291).

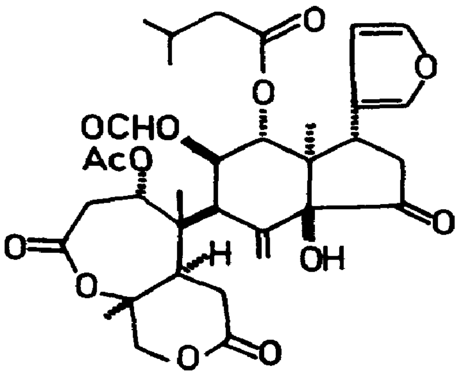
Distribution : Tirunelveli Hills in Western Ghats.

APHANAMIXIS (Meliaceae)

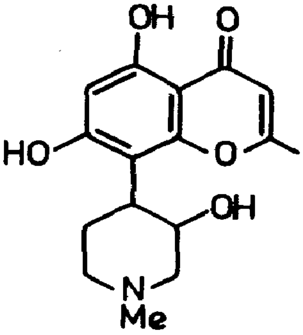
A. polystachya (Wall.) Parker syn. *Amoora rohituka* W. & A. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 39).

A limonoid - rohitukin - isolated from seeds and its structure established (*Chem. Commun.* 1976, 909); eight limonoids which belonged to ring A-lactone, ring B-cleaved meliacan group - rohituka 1 to 8 - isolated and their structures determined; rohituka 9 was not obtained in pure form (*Phytochemistry* 1978, *17*, 1995); crystal structure of main alkaloid - rohitukine (*Tetrahedron Lett.* 1979, 721).

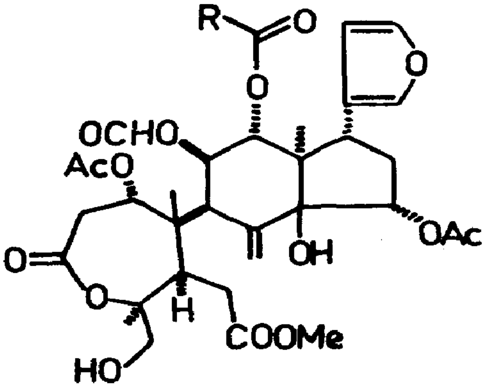
NEW COMPOUNDS



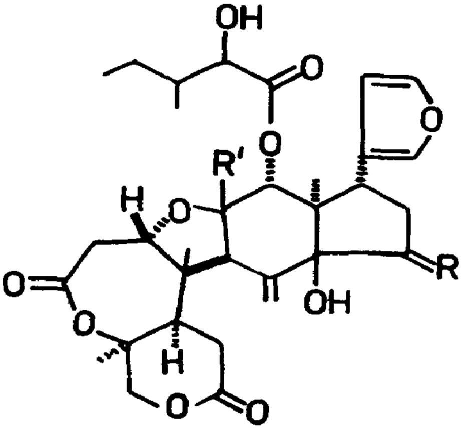
Rohitukin



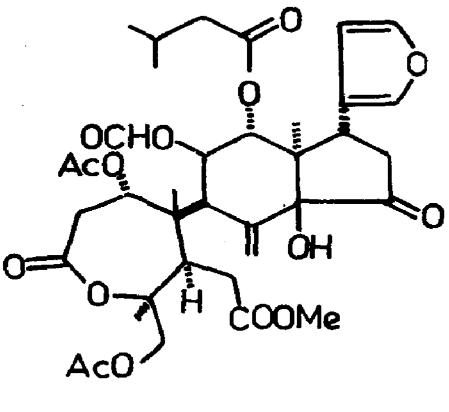
Rohitukine



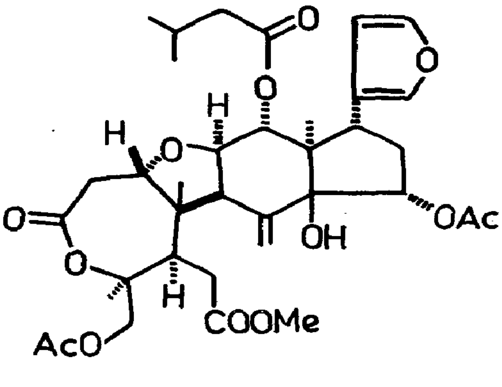
Rokituka 1
R = CH_2CHMe_2
Rohituka 2
R = CHOHCHMeEt



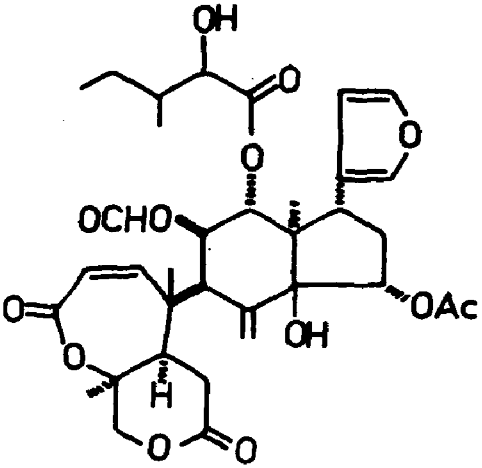
Rohituka 3
R = O, R′ = α-H
Rohituka 5
R = α-OAc,H, R′ = H



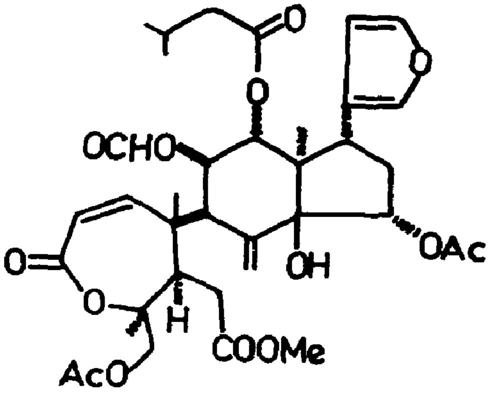
Rohituka 4



Rohituka 6



Rohituka 7



Rohituka 8

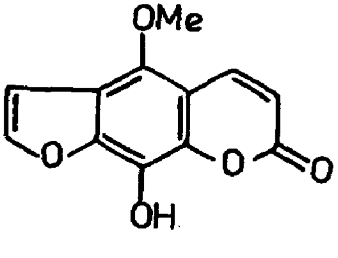
APIUM (Apiaceae)

A. graveolens L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 39).

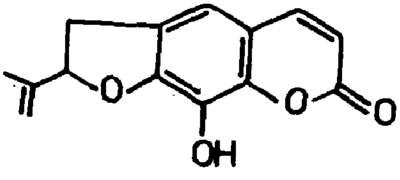
Seeds had CNS depressant effect whereas alkaloidal fraction from seeds showed tranquillising activity in mice and rats. It also protected mice against maximal electroshock seizures but was ineffective against metrazol and strychnine convulsions (*Indian J. Med. Res.* 1970, *58*, 99); both dialysed and non-dialysed solutions of aqueous extract on i.v. administration caused abrupt decrease in blood pressure of rabbits and significant increase in force of contraction of isolated heart of guinea pigs with no marked change in rate of contraction (*Varasam Paesachasarthara* 1977, *4*, 10; *Chem. Abstr.* 1978, *88*, 475 a).

Myristicic acid, 8-hydroxy-5-methoxypsoralen (I) and umbelliferone from seeds (*Phytochemistry* 1979, *18*, 352); apiin along with luteolin-7-apiosyl glucoside and chrysoeriol apiosylglucoside isolated from leaves and tubers (*Z. Lebensm.-Unters. Forsch.* 1979, *169*, 170; *Chem. Abstr.* 1979, *91*, 171672 d); a new furanocoumarin - apiumetin - isolated together with rutaretin from seeds and its structure established (*Phytochemistry* 1978, *17*, 2135).

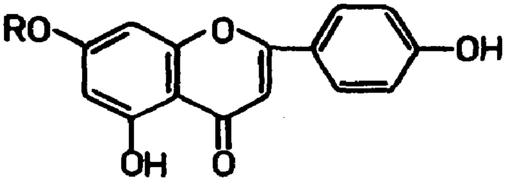
NEW COMPOUNDS



I



Apiumetin



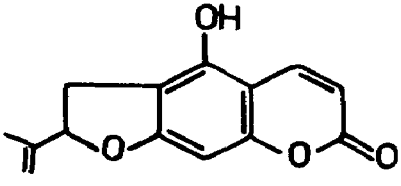
Apiin
R = Glu(2→1)Apiose

A. leptophyllum (Pers.) Muell.
H. - Ajmoda.

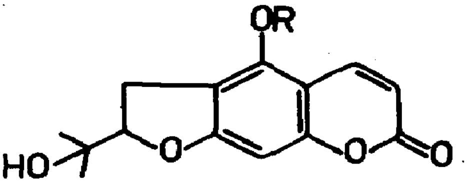
Bergapten and seselin from fruits (*Indian J. Pharm.* 1973, *35*, 127); new dihydrofurocoumarins - leptophyllidin, leptophyllin and leptophylloside - isolated from seeds along with umbelliferone, bergapten, isopimpinellin, seselin and D-mannitol, and their structures established (*Indian J. Chem.* 1978, *16*B, 563).

Distribution : American weed, introduced into India.

NEW COMPOUNDS



Leptophyllidin



Leptophyllin
R = H
Leptophylloside
R = Glu

A. petroselinum L.; see *Petroselinum crispum* (Mill.) A.W. Hill

AQUILEGIA (Ranunculaceae)

A. moorcroftiana Wall. ex Royle syn. *A. olympica* Boiss., *A. vulgaris* L. ssp. *pyrenaica* (DC.) Hook.f. & Thoms. p.p.

Berberine and magnoflorine (2.75%) from roots (*Aktual. Vopr. Farm.* 1974, *2*, 34; *Chem. Abstr.* 1976, *84*, 147617 y).

Distribution : Himalayas, Kashmir to Nepal, alt. 3800-4200 m.

A. olympica Boiss.; see *A. moorcroftiana* Wall. ex Royle

A. vulgaris L. ssp. *pyrenaica* (DC.) Hook.f. & Thoms.; see *A. moorcroftiana* Wall. ex Royle

ARACHIS (Papilionaceae)

A. hypogaea L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 22).

5,7-Dihydroxychromone (I), eriodictyol and luteolin from shells (*Phytochemistry* 1973, *12*, 2033); α-resorcylic, p-hydroxybenzoic, cis- and trans-p-coumaric, phloretic and vanillic acids along with protocatechuic and chlorogenic acids isolated from seeds (*Curr. Sci.* 1977, *46*, 236).

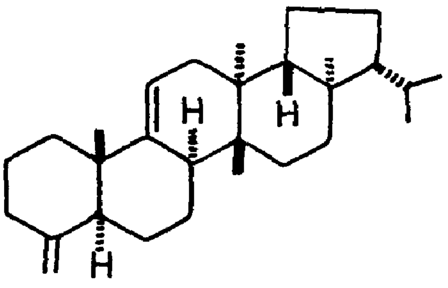
ARAIOSTEGIA (Davalliaceae)

A. perdurans (Christ) Copel.

24-Norferna-4(23),9(11)-diene (I) and davallic acid isolated (*Shoyakugaku Zasshi* 1978, *32*, 260; *Chem. Abstr.* 1979, *91*, 96562 n).

Distribution : Himalayas.

NEW COMPOUNDS



I

ARALIA (Araliaceae)

A. cachemirica Decne.

Sitosterol was isolated (*Indian J. Chem.* 1976, *14*B, 475).

Distribution : Himalayas from Kashmir to Sikkim, alt. 1700-2700 m.

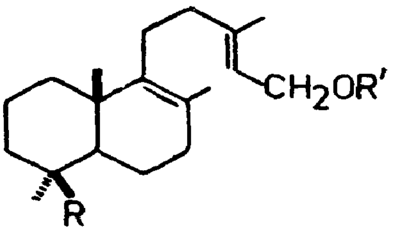
A. pseudoginseng (Wall.) Benth. ex Clarke; see *Panax pseudoginseng* Wall.

ARAUCARIA (Araucariaceae)

A. cunninghamii D.Don (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 40).

Methyl communate, methyl isocupressate and nine new labdane diterpenes (I to IX) isolated from oleoresin and their structures elucidated (*Chim. Ind.* 1969, *51*, 1383; *Chem. Abstr.* 1970, *72*, 111639 w; *Phytochemistry* 1974, *13*, 475); 4',7''-di-O-methylamentoflavone and 4',7,7''-tri-O-methylcupressoflavone isolated from leaves (*Chem. Pharm. Bull.* 1971, *19*, 1500).

NEW COMPOUNDS



I

R = COOH, R' = H

II

R = COOMe, R' = Ac

III

R = CH2OH, R' = H

IV

R = CHO, R' = H

V

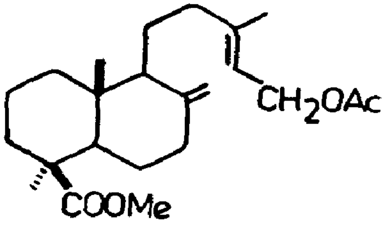
R = CH2OH, R' = Ac

VI

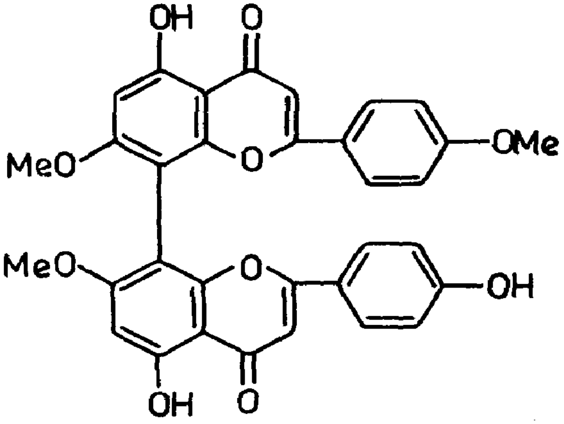
R = CHO, R' = Ac

VII

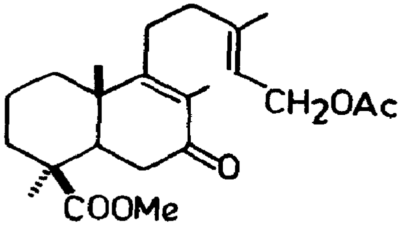
R = CH2OAc, R' = Ac



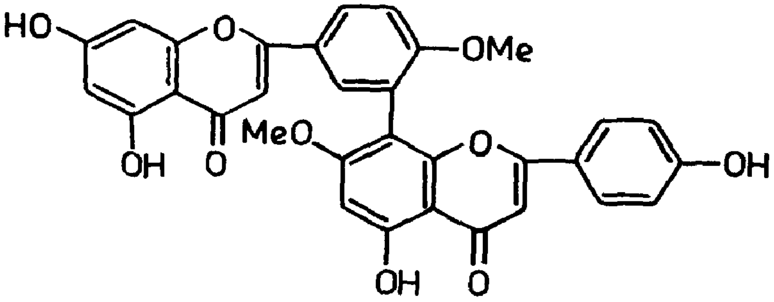
VIII



4',7,7''-Tri-O-methylcupressoflavone



IX

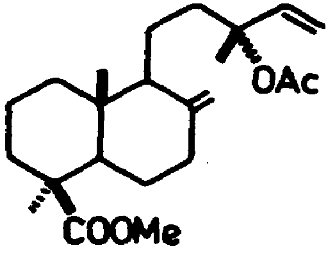


4',7''-Di-O-methylamentoflavone

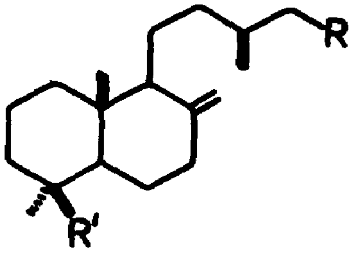
A. imbricata Pav. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 41).

Six new diterpenoid compounds - methyl 13-acetoxylabd-8(17),14-dien-19-oate (I), methyl 15-hydroxylabd-8(17)-en-19-oate (II), methyl labd-8(17)-en-15-oate (III), 15-hydroxylabd-8(17)-en (IV), 15-hydroxylabd-8(17)-en-19-al (V) and 15-acetoxylabd-8(17)-en (VI) - isolated from resin along with previously reported methyl 15-acetoxylabd-8(17)-en-19-oate, labd-8(17)-en-15,19-diol and 15-acetoxylabd-8(17)-en-19-al (*Gazz. Chim. Ital.* 1976, *106*, 1119; *Chem. Abstr.* 1977, *87*, 114628 n).

NEW COMPOUNDS



I



II
R = CH_2OH, R' = COOMe
III
R = COOMe, R' = Me
IV
R = CH_2OH, R = Me
V
R = CH_2OH, R' = CHO
VI
R = CH_2OAc, R' = Me

ARCHANGELICA (Apiaceae)

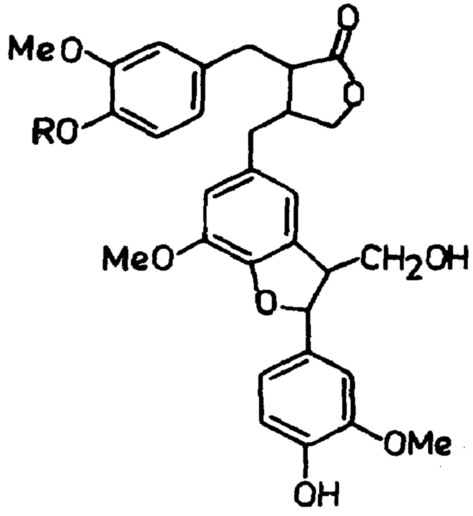
A. officinalis (Moench) Hoffm.; see *Angelica archangelica* L.

ARCTIUM (Asteraceae)

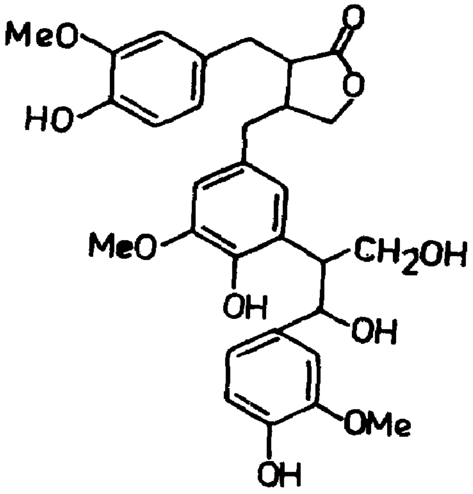
A. lappa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 41).

Eremophilene, fukinone, petasitolone, fukinanolide, β-eudesmol, taraxasterol, its acetate and palmitate, 9-dehydrofukinone and aretiol (8α-hydroxyeudesmol) from leaves (*Chem. Lett.* 1972, 235; *Chem. Abstr.* 1972, *76*, 150982 e); structures of two novel lignans - lappaols A and B - isolated from seeds (*Tetrahedron Lett.* 1976, 3961); two new stereoisomeric sesquilignan derivatives - AL-D and AL-F - isolated from fruits along with arctiin, arctigenin and matairesinol and their structures established (*Yakugaku Zasshi* 1976, *96*, 1492; *Chem. Abstr.* 1977, *86*, 136299 n); other sesquilignans - lappaols C,D and E - isolated and their structures determined (*Agric. Biol. Chem.* 1977, *41*, 1813; *Chem. Abstr.* 1978, *88*, 18995 e); two new dilignans - lappaols F and H - isolated and their structures elucidated (*Tetrahedron Lett.* 1978, 3035).

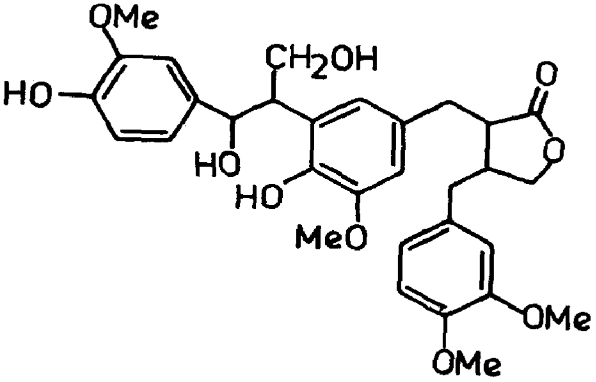
NEW COMPOUNDS



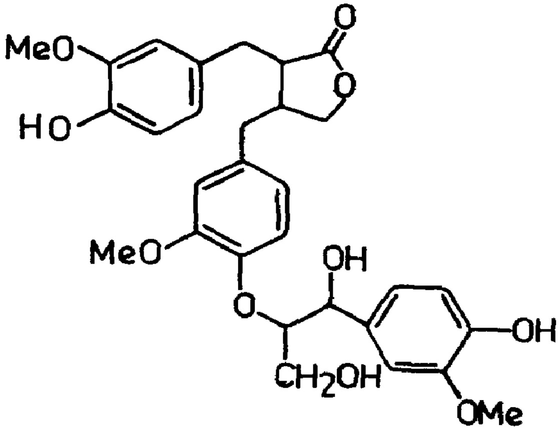
Lappaol A
R = H
Lappaol B
R = Me



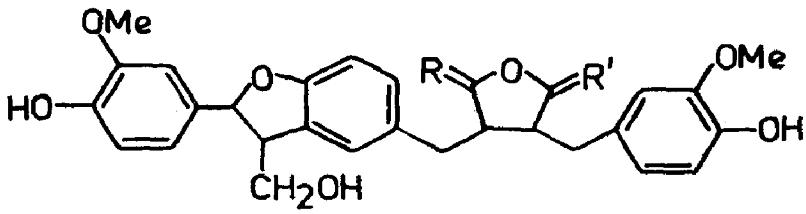
Lappaol C



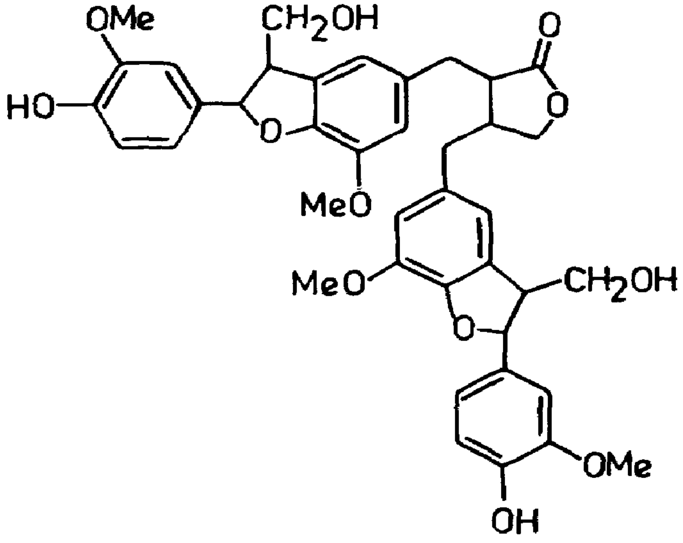
Lappaol D



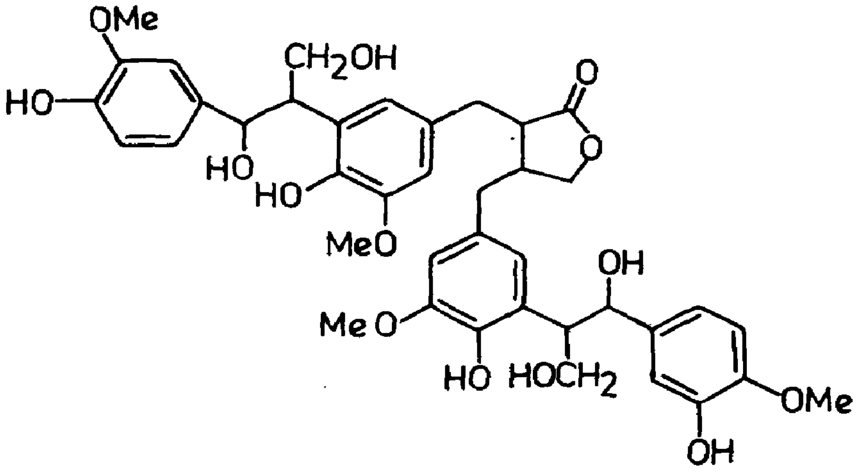
Lappaol E



AL-D
R = O, R′ = H,H
AL-F
R = H,H, R′ = O



Lappaol F



Lappaol H

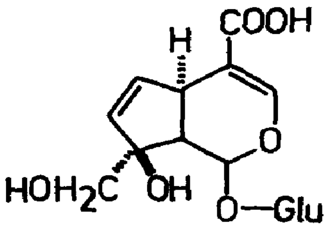
ARCTOSTAPHYLOS (Ericaceae)

A. uva-ursi Spreng. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 42).

Detection of eleven flavonoids in hydrolysed and nonhydrolysed extracts by PC, major aglycone was quercetin and minor was myricetin; five quercetin monoglycosides - quercetin-3-O-galactoside, -3-O-glucoside, -3-O-rhamnoside, -3-O-arabinoside and -7-O-glucoside - and two myricetin monoglycosides - myricetin -3-O-arabinoside and -3-O-diglucoside - as well as two quercetin diglycosides - quercetin-3-O-diglucoside and -3-O-rhamnoglucoside - identified (*Experientia* 1973, *29*, 939); oleanolic acid, taraxerol, ursolic acid, betulinic acid, lupeol, β-amyrin and β-sitosterol identified by TLC in flowers, leaves and bark (*Osaka Kogyo Daigaku*

Kiyo, Riko-hen 1974, *19*, 1; *Chem. Abstr.* 1978, *88*, 34499 b); an iridoid - monotropein - isolated from leaves (*Pharmazie* 1978, *33*, 536; *Chem. Abstr.* 1978, *89*, 193843 w).

NEW COMPOUNDS



Monotropein

ARDISIA (Myrsinaceae)

A. humilis Vahl; see *A. solanacea* Roxb.

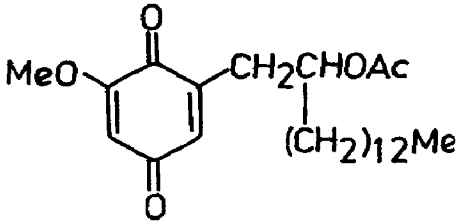
A. pauciflora Heyne; see *A. guinguegona* Blume

A. quinquegona Blume syn. *A. pauciflora* Heyne

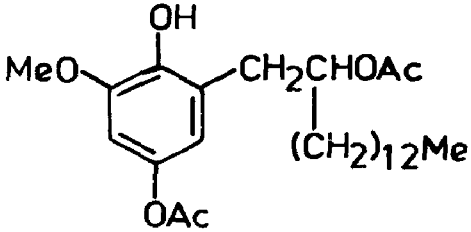
Ardisianone and ardisianol isolated and their structures elucidated (*Bull. Chem. Soc. Jpn.* 1978, *51*, 943).

Distribution : Hills of south India.

NEW COMPOUNDS



Ardisianone



Ardisianol

A. solanacea Roxb. syn. *A. humilis* auct. (non Vahl) p.p. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 22).

Bauerenol, α-amyrin and β-amyrin isolated from leaves (*Planta Med.* 1977, *32*, 162).

ARECA (Arecaceae)

A. catechu L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 42).

Aqueous extract and polyphenolic fraction of Mangalore betel nut, administered i.p. to mice, decreased nucleic acid and protein content in almost all tissues and decreased glycogen and increased sialic acid in lung and kidney tissues (*Indian J. Pharamacol.* 1978, *10*, 191).

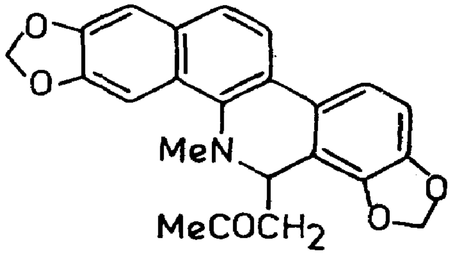
ARGEMONE (Papaveraceae)

A. mexicana L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 42).

Argemone oil when administered in doses of 1/1000 LD50 to rats for 3 months caused reversal of albumin and globulin ratio, significant increase in GOT values and mild anaemia associated with myocardial and hepatic necrosis (*Indian J. Med. Sci.* 1972, *26*, 308).

Detection of hydroxy (1.0), epoxy (2.0%) and keto fatty acids in seed oil; myristic, palmitic, oleic and linoleic acids also found (*Fette, Seifen, Anstrichm.* 1972, *74*, 268; *Chem. Abstr.* 1972, *77*, 85578 g); out of six alkaloids isolated, four identified as heletrine, sanguinarine, protopine and allocryptopine;protopine (21.0, 16.0) and allocryptopine; (37.0 and 36.0%) determined in leaves and roots respectively of Vietnamese plant (*Farmatsiya* 1973, 22, 32; *Chem. Abstr.* 1973, *79*, 113201 r; *Aktual Vopr. Farm.* 1974, *2*, 24; *Chem. Abstr.* 1976, *84*, 147614 w; *Z. Chem.* 1976, *16*, 54; *Chem. Abstr.* 1976, *85*, 5917 u); a benzophenanthridine base (I) isolated in addition to norsanguinarine, dihydrosanguinarine, chelerythrine, norchelerythrine, berberine and coptisine (*Z. Chem.* 1976, *16*, 54; *Chem. Abstr.* 1976, *85*, 5917 u); crystalline mixture of 9 - and 11-oxo-octacosanoic and 11-oxotriacontanoic acids isolated from seed oil (*Chem. Phys. Lipids* 1977, *20*, 331; *Chem. Abstr.* 1978, *88*, 101585 s).

NEW COMPOUNDS



I

A. ochroleuca Sweet

H. - Vilayti Bhatkatiya, Shailkanta; S. - Srigala-kantaka; Mal. - Ponnummattam; P. - Siakanta; Tam. - Bramadandu; Tel. - Brahmadandi.

Allocryptopine, protopine, berberine, sanguinarine, chelerythrine, coptisine isolated (*Collect. Czech. Chem. Commun.* 1973, *38*, 2307).

Distribution : Throughout plains of India, ascending to 1500 m in hills.

ARGYREIA (Convolvulaceae)

A. nervosa (Burm.f.) Boj. syn. *A. speciosa* Sweet (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 43).

Seed extract showed hypotensive activity (*Indian J. Pharm.* 1974, *36*, 118).

1-Triacontanol, β-sitosterol, epifriedelinol and its acetate isolated (*Phytochemistry* 1971, *10*, 1949); ergometrine, caffeic acid and ethyl caffeate isolated from seeds (*Indian J. Pharm.* 1974, *36*, 118).

A. speciosa Sweet; see *A. nervosa* (Burm.f.) Boj.

ARISAEMA (Araceae)

A. curvatum (Roxb.) Kunth; see *A. tortuosum* (Wall.) Schott var. *curvatum* (Roxb.) Engler

A. tortuosum Hook.f.; see *A. tortuosum* (Wall.) Schott var. *curvatum* (Roxb.) Engler

A. tortuosum (Wall.) Schott var. *curvatum* (Roxb.) Engler syn. *A. curvatum* (Roxb.) Kunth,

A. tortuosum sensu Hook.f. p.p. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 24).

Cysteine, ornithine, asparagine, glycine, glutamic acid, threonine, α-alanine, β-alanine and norvaline from fruits (*J. Sci. Res.* 1971, *3*, 1; *Chem. Abstr.* 1974, *80*, 45669 t); n-alkanes, n-alkanols, stigmasterol, sitosterol, campesterol and cholesterol isolated and identified in corms (*Indian J. Pharm.* 1978, *40*, 24).

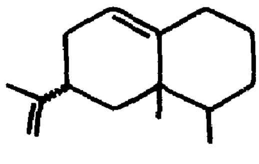
ARISTOLOCHIA (Aristolochiaceae)

A. indica L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 43).

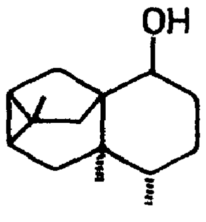
Studies on interceptive properties of three fractions of chloroform extract in mice showed 40 to 60 mg/kg as MED. Histological study of uterus and ovary revealed no change except for presence of degenerated corpora lutea in case of one fraction (*Indian J. Med. Res.* 1977, *66*, 991).

Two new sesquiterpene hydrocarbons - ishwarane and aristolochene - from roots (*Tetrahedron* 1970, *26*, 615); structure of a tetracyclic sesquiterpene - ishwarone - determined (*Tetrahedron* 1970, *26*, 2371); ishwarol isolated from roots and its structure established (*Indian J. Chem.* 1971, *9*, 1310); a new sesquiterpene hydrocarbon (I) isolated and characterised as 5β-H,7β,10α-selina-4(14),11-diene (*Indian J. Chem.* 1973, *11*, 971); five new phenanthrene derivatives (II-VI) isolated and characterised in addition to isolation of stigmast-4-en-3-one, sitosterol and two uncharacterised isomeric sesquiterpene alcohols mp. 103° and 150° (*Phytochemistry* 1977, *16*, 1103).

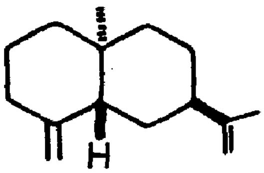
NEW COMPOUNDS



Aristolochene



Ishwarol



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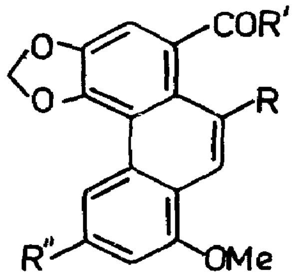
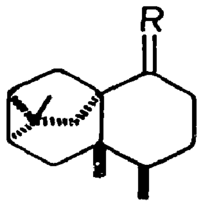


II
R,R'' = H, R' = OMe
III
R,R'' = H, R' = OH
IV
R, R'' = H, R' = NH_2

R = H, R',R'' = OMe
VI
R = NO_2, R' = Me, R'' = H



Ishwarane
R = H,H
Ishwarone
R = O

ARNEBIA (Boraginaceae)

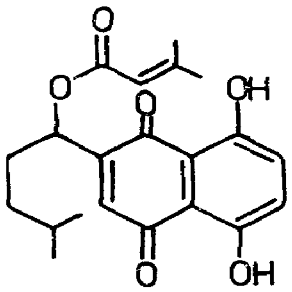
A. nobilis Reichb. f.

Extract showed antimicrobial and ai ancer activities (*Phytochemistry* 1971, *10*, 1909).

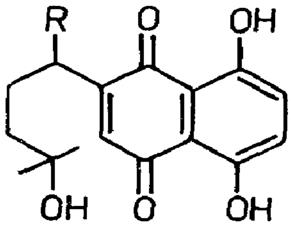
Three new naphthoquinones - 5,8-dihydroxy-2-(1'-β,β-dimethylacryloxy-4'-methylpentyl)-1,4-naphthoquinone (I), 5,8-dihydroxy-2-(4'-hydroxy-4'-methylpentyl)-1,4-naphthoquinone (II) and 2-(1'-acetoxl'-hydroxy-1'-methylpentyl)-5,8-dihydroxy-1,4-naphthoquinone (III) - isolated along with alkannin, 5,8-dihydroxy-2-(1'-β,β-dimethylacryloxy-4'-methylpent-1'-enyl)-1,4-naphthoquinone and 5,8-dihydroxy-2-(1'-acetoxy-4'-methylpent- 3'-enyl)-1,4-naphthoquinone (*Phytochemistry* 1971, *10*, 1909); hexacosanol, heptacosanoic acid and sitosterol were isolated (*Phytochemistry* 1972, *11*, 2621).

Distribution : Grows wild in Afghanistan from where roots are imported into India.

NEW COMPOUNDS



I



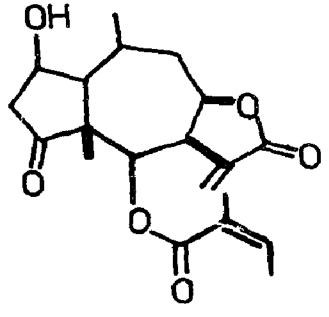
II
R = H
III
R = OAc

ARNICA (Asteraceae)

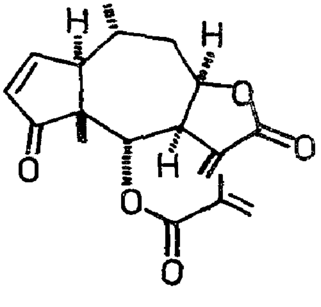
A. montana L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 44).

A sesquiterpene lactone - arnifoline, mp. 128° - isolated and its structure established (*Khim. Farm. Zh.* 1969, *3*, 39; *Chem. Abstr.* 1970, *72*, 32047y; *Sb. Nauch. Rab. Vses. Nauch. Issled. Inst. Lek. Rast.* No. 1, 1970, 148; *Chem. Abstr.* 1972, *76*, 141046 a); thymol, its methyl ether, caffeic acid and β-sitosterol from buds (*Sci. Pharm.* 1970, *38*, 255; *Chem. Abstr.* 1971, *74*, 121363 g); seven sesquiterpenic lactones and one flavone - pectolinarigenin - isolated from leaves; structures of four lactones - arnicolides A,B,C and D - determined and two lactones identified as dihydrohelenalin and tetrahydrohelenalin (*Collect. Czech. Chem. Commun.* 1971, *36*, 2189); leaves contained essential oil (0.21-0.51%) and fatty acids (18.0%); detection of palmitic (37.5), linolenic (24.2), linoleic (24.5) and palmitoleic acids (7.2%) by GC (*Z. Naturforsch.* B 1972, 27; *Chem. Abstr.* 1972, *77*, 85568 d); thymol, its methyl ether, 8,9-dehydrothymol methyl ether and 8,9-dehydrothymol dimethyl ether from essential oil of underground parts of plant; its chief component identified as 4-hydroxythymol dimethyl ether (*Planta Med.* 1972, *22*, 1); detection of α- and β-carotenes, cryptoxanthin, trans-lutein, cis-lutein, flavochrome, mutachrome, lutein-5,6-epoxide, luteoxanthin and aureoxanthin by TLC (*Planta Med.* 1973, *23*, 308); structure of a new alkaloid - N-ethoxycarbonyl-L-prolonamide (I) - isolated from leaves (*Collect. Czech. Chem. Commun.* 1977, *42*, 151); a new sesquiterpene lactone - helenalin methacrylate - along with helenalin acetate isolated from flowers (*Planta Med.* 1978, *34*, 299); identification of p-hydroxybenzoic, p-coumaric, gentisic, vanillic, protocatechuic and caffeic acids in inflorescences (*Herba Pol.* 1978, *24*, 187; *Chem. Abstr.* 1979, *91*, 52764 a).

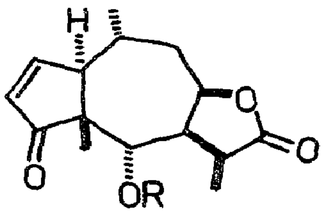
NEW COMPOUNDS



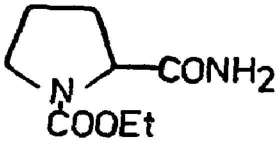
Arnifoline



Helenalin methacrylate



Arnicolide A
R = COMe
Arnicolide B
R = $COCH_2CHMe_2$
Arnicolide C
R = $COCHMe_2$
Arnicolide D
R = $COCMe{=}CH_2$



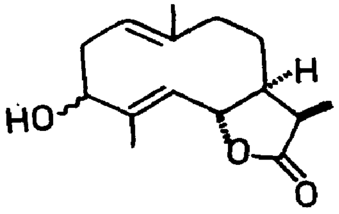
I

ARTEMISIA (Asteraceae)

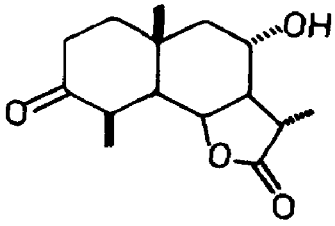
A. absinthium L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi 1990, p. 45).

A new sesquiterpene lactone - artabin - isolated from aerial parts and its structure established (*Khim. Prir. Soedin*. 1970, *6*, 622, 691; *Chem. Abstr.* 1971, *74*, 50523 w, 112239 u); a new lactone - arabsin, mp. 188°, isolated (*Khim. Prir. Soedin.* 1972, *8*, 245; *Chem. Abstr.* 1972, *77*, 85567 c); revised structure and absolute configuration of artabsin (*Collect. Czech. Chem. Commun.* 1972, *37*, 1346); isolation of cis- and trans- epoxyocimenes from essential oil of Italian plant (*Riv. Ital. Essenze Profumi Piante Off. Aromi Saponi, Cosmet. Aerosol* 1976, *58*, 522; *Chem. Abstr.* 1977, *86*, 161105 d); cis-12,13-epoxy-cis-9-octadecenoic acid (1.48), cis-9,10-epoxy-cis-12-octadecenoic acid (5.94%) and traces of 9,10-epoxyoctadecenoic acid from seed oil (*Khim. Prir. Soedin.* 1976, *12*, 705; *Chem. Abstr.* 1977, *86*, 86120 z); two stereoisomeric 3,7-dioxabicyclo[3,3,0]-octanes (I,II) and germacra-1(10)-en-3-oxo-6,12-olide (III) (ketopelenolide) along with a new guaianolide, mp. 215°, obtained from Yugoslavian species (*Glas. Hem. Drus. Beogr.* 1976, *41*, 287; *Chem. Abstr.* 1977, *87*, 98796 h); structure elucidation of thiophene derivative (IV), isolated from roots of Aus'-ian plant together with trans-dehydromatricaria methyl ester and C_{13} and C_{14} trans-spiroketalenol ethers (V,VI) (*Phytochemistry* 1978, *17*, 806).

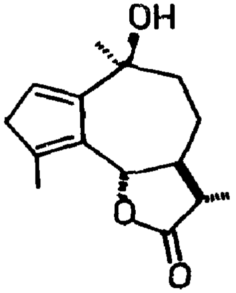
NEW COMPOUNDS



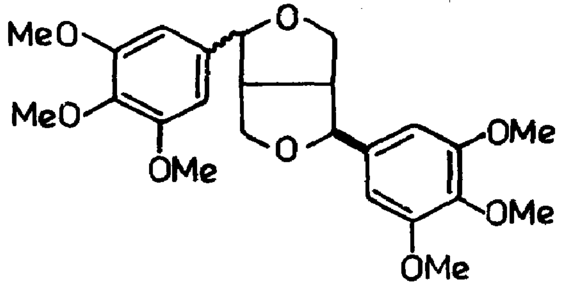
Artabin



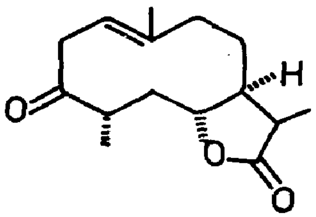
Arabsin



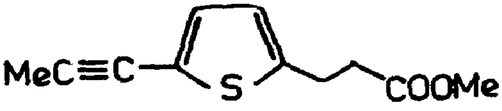
Artabsin



I (6α)
II (6β)



III



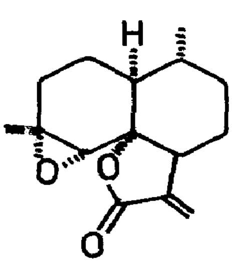
IV

V (n = 1)
VI (n = 2)

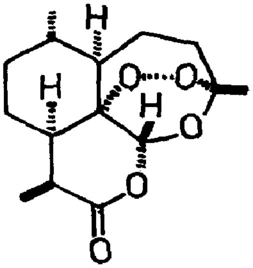
A. annua L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehtrotra, PID, New Delhi, 1990, p. 45).

Scopoletin and scopolin isolated from aerial parts (*Khim. Prir. Soedin.* 1970, *6*, 758; *Chem. Abstr.* 1971, *74*, 95433 h); a new sesquiterpene lactone - arteannuin B - isolated and its structure established (*Tetrahedron Lett.* 1973, 3039); a new flavonol - quercetagetin-6,7,3',4'-tetramethyl ether, mp. 171° - isolated (*Phytochemistry* 1975, *14*, 1873; *Planta Med.* 1976, *29*, 528); n-nonacosane, n-pentacosane and β-amyrin acetate isolated (*Planta Med.* 1976, *29*, 528); a new sesquiterpene lactone - qinghaosu (I) - isolated and its structure established (K'o *Hsueh T'ung Pao* 1977, *22*, 142; *Chem. Abstr.* 1977, *87*, 98788 g).

NEW COMPOUNDS



• Arteannuin B

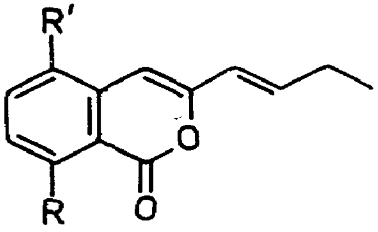


I

A. dracunculus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehtrotra, PID, New Delhi, 1990, p. 45).

Scopoletin and β-sitosterol isolated from leaves collected during budding and flowering stages (*Khim. Prir. Soedin.* 1969, *5*, 320; *Chem. Abstr.* 1970, *72*, 51802 g); quercetin, hyperoside and isorhamnetin from leaves (*Khim. Prir. Soedin.* 1969, 5, 323; *Chem. Abstr.* 1970, 72, 63619 r); artemidin isolated from aerial parts and its structure established (*Khim. Prir. Soedin.* 1970, *6*, 467, 531; *Chem. Abstr.* 1971, *74*, 10344g, 76270m); bioquercetin, rutin and quercetin-3-(β-D-galactofuranosyl-6-β-L-rhamnopyranoside) isolated (*Khim. Prir. Soedin.* 1970, *6*, 629; *Chem. Abstr.* 1971, *74*, 50530 w); a new isocoumarin - artemidinol - isolated from leaves and its structure determined (*Khim. Prir. Soedin.* 1971, *7*, 2087; *Chem. Abstr.* 1971, *75*, 115871 a; (*Khim. Prir. Soedin.* 1976, *12*, 811; *Chem. Abstr.* 1977, *86*, 136302 h); artemidin, its cis isomer, artemidinol and another isocoumarin (I) isolated and characterised (*Phytochemistry* 1977, *16*, 795); cis-β-ocimene and trans-β-ocimene isolated from essential oil (*Riv. Ital. Essenze, Profumi, Piante Off., Aromat., Syndets, Saponi, Cosmet., Aerosols* 1978, *60*, 286; *Chem. Abstr.* 1978, *89*, 168947 a).

NEW COMPOUNDS



Artemidin
R,R' = H
Artemidinol
R = H, R' = OH
I
R = OH, R' = H

A. fragrans Willd.; see *A. maritima* L.

A. gmelini Web ex Stechm. syn. *A. sacrorum* Ledeb. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 45).

Scopoletin isolated from shoots (*Khim. Prir. Soedin.* 1972, *8*, 643; *Chem. Abstr.* 1973, *78*, 108211 u).

A. grata Wall.; see *A. roxburghiana* Besser var. *roxburghiana*

A. japonica Thunb. syn. *A. parviflora* Roxb. ex D.Don

6,7-Dimethylaesculetin, aesculetin and scopoletin isolated (*Curr. Sci.* 1976, *45*, 640).

Distribution : Himalayas from Kashmir to Sikkim, alt. 2100-3500 m, Meghalaya, alt. 1500-2100 m, Parasnath Hills in Bihar, alt. 1200 m, Western Ghats from Konkan southwards to Pulney Hills.

A. macrocephala Jacq. ex Bess.

Aerial part of Siberian plant contained 0.15-0.48% oil depending on growth phase; oil contained acetic, propionic and enanthic acids, cresol, p-cresol, α- and β-pinenes, car-3-ene, limonene, 1,8-cineole, p-cymol, thujone, camphor, borneol and chamazulene (*Rastit. Resur.* 1976, *12*, 565; *Chem. Abstr.* 1977, *86*, 40142 e).

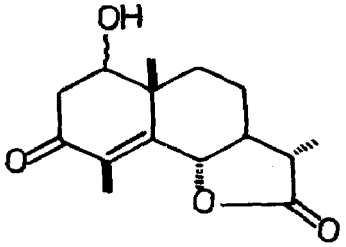
Distribution : Lahul and Ladakh, alt. 4500-5200 m.

A. maritima L. syn. *A. fragrans* Willd., *A. spicigera* C. Koch. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 46).

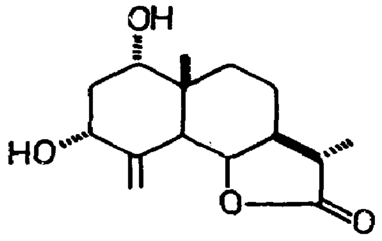
Structure of erivanin, mp. 203°, determined (*Khim. Prir. Soedin.* 1969, *5*, 239; *Chem. Abstr.* 1970, *72*, 32051 v); santonin (0.2%) isolated (*Phytochemistry* 1972, *11*, 3542); besides lavandulol, nerol and their acetates, a cyclobutane derivative - fragranol - and its esters (I-IV) isolated from roots (*Chem. Ber.* 1973, *106*, 2904); isolation and structure of a sesquiterpene lactone - alkhanin (*Khim. Prir. Soedin.* 1978, *14*, 75; *Chem. Abstr.* 1978, *88*, 191129 y);

stereostructure of a new germacranolide - gallicin (*J. Chem. Soc.* Perkin 1 1978, 1243); davanone along with other terpenes isolated from essential oil (*Arch. Pharm.* 1979, *312*, 435; *Chem. Abstr.* 1979, *91*, 74732 r).

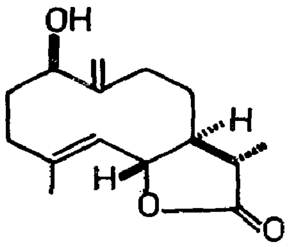
NEW COMPOUNDS



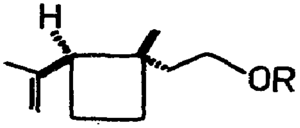
Alkhanin



Erivanin



Gallicin

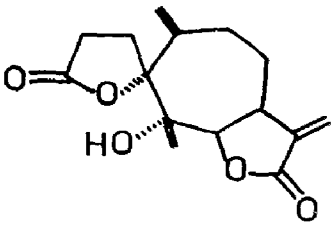


Fragranol
R = H
I
R = COMe
II
R = $COCHMe_2$
III
R = $COCH_2CHMe_2$
IV
R = COCHMeEt

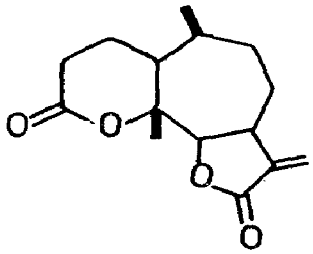
A. nilagirica (Clarke) Pamp. syn. *A. vulgaris* auct. (non L.) (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 46).

Acetylenic compounds - trideca-1,3,5-trien-7,9,11-triyne, tetradeca-4,6-dien-8,10,12-triyne-1-ol, heptadeca-1,7,9-trien-11,13,15-triyne, cis-dehydromatricaria ester and tetradeca-6-en-8,10,12-triyne-3-one - isolated (*Phytochemistry* 1974, *13*, 455); sesquiterpenoid lactones - psilostachyin A and psilostachyin C - isolated (*Glas. Hem. Drus. Beogr.* 1972, *37*, 463; *Chem. Abstr.* 1974, *80*, 80080 r).

NEW COMPOUNDS



Psilostachyin A

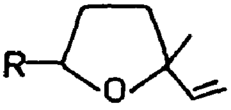


Psilostachyin C

A. pallens Wall. ex DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 46).

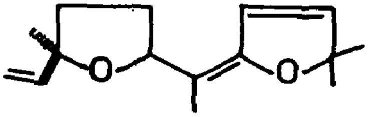
Isolation, structure and synthesis of artemone (*Tetrahedron Lett.* 1970, 5021); isolation, structure and synthesis of davana ether (*Helv. Chim. Acta* 1971, *54*, 1890).

NEW COMPOUNDS



Artemone

R =



Davana ether

A. parviflora Roxb. ex D. Don; see *A. japonica* Thunb.

A. persica Boiss. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 47).

Scopoletin isolated from leaves and stems (*Khim. Prir. Soedin.* 1969, *5*, 319; *Chem. Abstr.* 1970, *72*, 63625 q).

A. roxburghiana Besser var. *grata* (Wall.) Hook.f.; see *A. roxburghiana* Besser var. *roxburghiana*

A. roxburghiana Besser var. *roxburghiana* syn. *A. grata* Wall.,

A. roxburghiana Besser var. *grata* (Wall.) Hook.f.

Hι riacontane, α- and β-amyrins, hentriacontanol and β-sitosterol isolated from aerial parts (*Indian J. Pharm. Sci.* 1978, *40*, 102).

Distribution : Western Himalayas, Kashmir to Kumaon, alt. 1500- 3000 m.

A. sacrorum Ledeb.; see *A. gnelini* Web ex Stechm.

A. scoparia Waldst. & Kit. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 47).

Caryophyllene epoxide isolated from oil (*Curr. Sci.* 1970, *39*, 182); a lactone, mp. 146°, isolated from roots (*Khim. Prir. Soedin.* 1971, *7*, 376; *Chem. Abstr.* 1971, *75*, 115850 t); scoparone (6,7-dimethoxycoumarin) isolated from herb (*Indian J. Med. Res.* 1972, *60*, 763); capillin, 1-phenyl-2,4-hexadiyne-1-ol, vanillin and scoparone from leaves and flowers (*Phytochemistry* 1973, *12*, 2996).

BIOLOGICAL ACTIVITY

Scoparone showed dose-dependent hypotensive and tranquillising action in dogs, cats and rats. It caused peripheral vasodilation and had antispasmodic and relaxant action on smooth muscle. Its LD50, ip, was 210 mg/kg in rats and 180 mg/kg in mice (*Indian J. Med. Res.* 1972, *60*, 763); evaluation of hypotensive activity of dihydroxycoumarins and their congeners revealed that scoparone had maximal activity, more significant than that of L-α-methyldopa (*Experientia* 1978, *34*, 158).

A. spicigera C. Koch.; see *A. maritima* L.

A. vestita Wall. ex DC.

Essential oil obtained from leaves contained n-capryl aldehyde, α-d-phellandrene, 1,8-cineole, α-terpinene, β-thujone, thujyl alcohol, α-cadinene and cadalene (*Flavour Ind.* 1971, *2*, 539; *Chem. Abstr.* 1972, *76*, 17722 d).

Distribution : Western Himalayas from Kashmir to Kumaon, alt. 2000-3000 m.

A. vulgaris L.; see *A. nilagirica* (Clarke) Pamp.

ARTHROCNEMUM (Chenopodiaceae)

A. glaucum Ung.

Three C_{29} sterols of stigmastane type present in plant, one of these identified as fucosterol (*Egypt. J. Chem.* 1974, *17*, 869; *Chem. Abstr.* 1977, *86*, 86168 w).

Distribution : Deccan Peninsula.

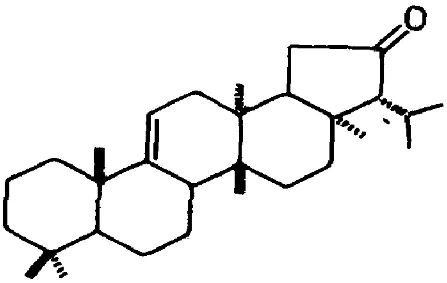
ARTHROMERIS (Polypodiaceae)

A. wallichiana (Spreng.) Ching syn. *Pleopeltis juglandifolia* (D. Don) Moore, *Polypodium juglandifolium* D. Don

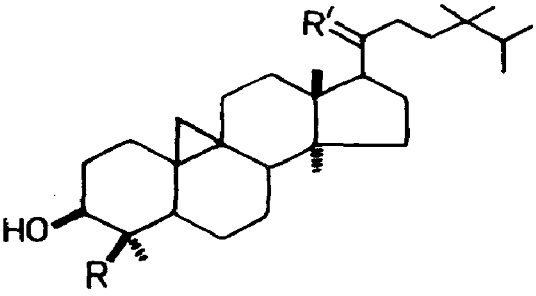
Nine triterpenoids isolated from rhizomes; compound A identified as fern-9(11)-en-6α-ol, compound D as fern-9(11)-en-20α-ol, E as 24,24-dimethyl-9,19-cyclolanost-25-en-3β-ol, F as hopan-30-ol (dryocrassol), B and C as acetates of E and F respectively, G as fern-9(11)-en-20-one, H as 24,24-dimethyl-9,19-cyclolanostan-3β-ol and J as 4β-desmethyl-24,24-dimethyl-9,19-cyclolanost-20(21)-en-3β-ol (*J. Chem. Soc.* Perkin 1 1976, 117; *Indian J. Chem.* 1977, *15*B, 541); fernene, filicene, cyclolaudenol, cycloneolitsol, polypodinols A,B,C and D isolated (*J. Indian Chem. Soc.* 1978, *55*, 415).

Distribution : Himalayas from Garhwal to Bhutan, alt. 600-2700 m, Khasi Hills alt. 600-1500 m.

NEW COMPOUNDS



Compound G



Compound H
R = Me, R′ = α-Me,β-H
Compound J
R = H, R′ = CH_2

ARTOCARPUS (Moraceae)

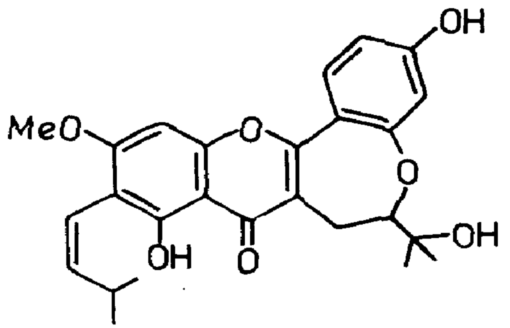
A. chama Buch.-Ham. syn. *A. chaplasha* Roxb.

B. - Chaplash; Assam - Sam; Trade - Chaplash.

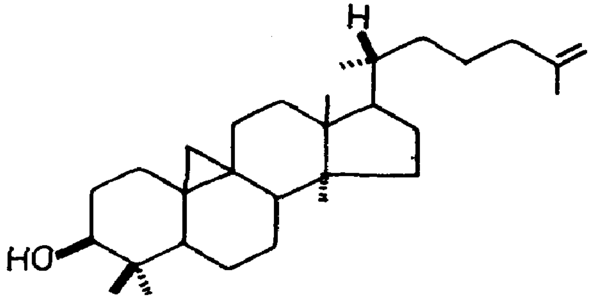
A new triterpene - isocycloartenol - isolated from stem bark along with lupeol acetate, cycloartenyl acetate and β-sitosterol (*Phytochemistry* 1971, *10*, 1351); a new flavone - chaplashin - isolated from heartwood (*Indian J. Chem.* 1972, *10*, 905).

Distribution : Sub-Himalayan tracts from Nepal eastwards to Bengal and Assam and Andaman Islands.

NEW COMPOUNDS



Chaplashin



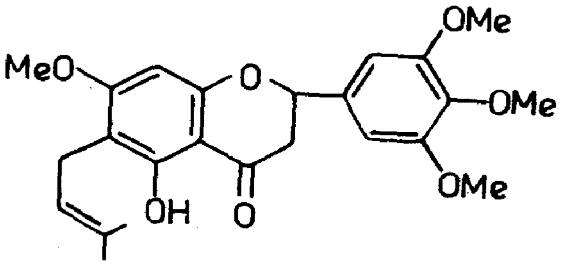
Isocycloartenol

A. chaplasha Roxb.; see *A. chama* Buch.-Ham.

A. heterophyllus Lam. syn. *A. integrifolia* L.f. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 48).

Cycloartenyl acetate, cycloartenol and cycloartenone isolated from bark (*Phytochemistry* 1973, *12*, 2725); a new compound - artoflavanone - isolated from roots besides β-sitosterol, betulinic and ursolic acids (*Indian J. Chem.* 1974, *12*, 895).

NEW COMPOUNDS



Artoflavanone

A. integrifolia L.f.; see *A. heterophyllus* Lam.

A. lakoocha Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 49).

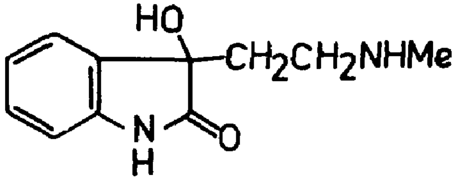
Cycloartenyl acetate, cycloartenol and cycloartenone isolated from bark of Ceylonese plant (*Phytochemistry* 1973, *12*, 2725).

ARUNDO (Poaceae)

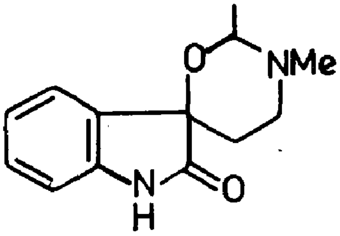
A. donax L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 27).

Gramine and its methohydroxide, eleagnine, N,N-dimethyltryptamine methohydroxide and 3,3′-bis(indolylmethyl) dimethylammonium hydroxide isolated from flowers (*Phytochemistry* 1971, *10*, 2852); in addition, 5-methoxy-N-methyltryptamine, bufotenine, N,N-dimethyltryp tamine and gramine Nb-oxide also isolated from flowers (*Planta Med.* 1972, *21*, 22); structure of donaxaridine and donaxarine determined (*Khim. Prir. Soedin.* 1976, *12*, 553; *Chem. Abstr* 1977, *86*, 121586 e).

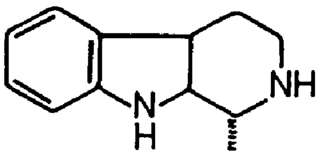
NEW COMPOUNDS



Donaxaridine



Donaxarine



Eleagnine

ASCLEPIAS (Asclepiadaceae)

A. curassavica L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 28).

Used in folk medicine for treating cancer and warts; alcoholic extract active in KB tumor system (*Science* 1964, *146*, 1685); plant extract stimulated central nervous system as reflected by increased levels of serotonin and noradrenaline (*An. Inst. Farmacol. Esp.* 1971, *20*, 299; *Chem. Abstr.* 1973, *79*, 27286 r); alcoholic extract of plant exhibited strong cardiotonic action (*Indian J. Chem.* 1969, 7, 1105).

Uzarigenin, crotoxigenin, coroglaucigenin, calotropin and curassavicine (*Naturwiss.* 1959, *46*, 263; *Science* 1964, *146*, 1685; *Hsueh Hsueh Pao*, 1964, *11*, 80; *Chem. Abstr.* 1964, *61*, 3574); in addition, calactin, calotropagenin and uzarin identified; a new acylated genin - asclepin - and its four glycosides H_1,H_2 (glucorhamnosides), I and J (glucosides) isolated and characterised (*Indian J. Chem.* 1969, *7*, 1105; *Phytochemistry* 1972, *11*, 757).

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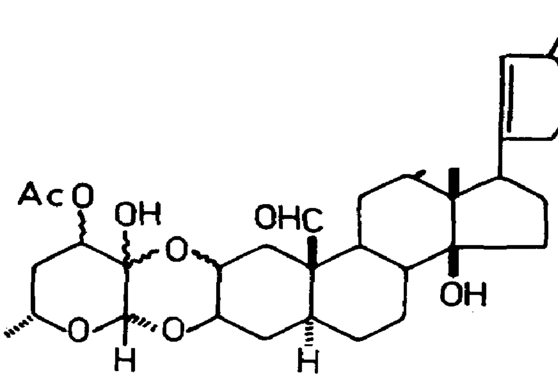


Asclepin

BIOLOGICAL ACTIVITY

Asclepin showed cardiotonic activity in a number of normal and hypodynamic *in vitro* and *in vivo* preparations in various animal species. Hatcher dose of asclepin was lowest in cat (205 μg/kg), LD in pigeon was 400 μg/kg,i.v. (*Arzneim. Forsch.* 1978, *28*, 1095); marked positive inotropic effect of asclepin studied *in vitro* (isolated atrium and heart of guinea pig) and *in vivo* (anaesthetised cat) and compared with that of g-strophanthin, digoxin and digitoxigenin. The comparative safety margin and other data indicate that asclepin is a more potent, longer-acting and safer cardenolide than the other three substances (*Arzneim. Forsch.* 1978, *28*, 1368).

ASPARAGUS (Liliaceae)

A. gonocladus Baker (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 28).

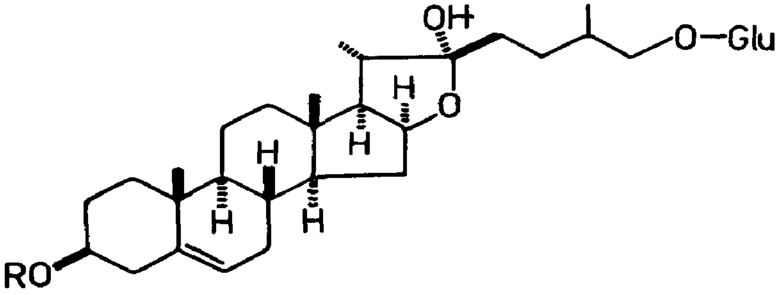
An anthocyanin - malvin - and asparagine from flowers (*J. Indian Chem. Soc.* 1978, *55*, 520).

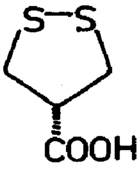
A. officinalis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 49).

New plant growth inhibitors - asparagusic, dihydroasparagusic and S-acetyl-dihydroasparagusic acids - isolated (*Tetrahedron Lett.* 1972, 2549; *Plant Cell Physiol.* 1972, *13*, 923; *Chem. Abstr.* 1973, *78*, 26473 s); β-sitosterol, sarsasapogenin and nine asparagosides A,B,C,D,E,F,G,H and I isolated from roots; asparagosides A,C,D and F contained spirastanol as aglycone whereas B,E,G,H and I contained (25S)5β-furostan-3β,22,26-triol as aglycone; structures of asparagosides A and B determined (*Khim. Prir. Soedin.* 1976, *12*, 400; *Chem. Abstr.* 1976, *85*, 90178 w; *Dokl. Akad. Nauk SSSR* 1976, *231*, 1479; *Chem. Abstr.* 1977, *86*, 68399 t); structures of asparagoside C, mp. 287° and E, mp. 254° (*Khim. Prir. Soedin.* 1976, *12*, 823; *Chem. Abstr.* 1977, *86*, 103064 d); structures of asparagosides F and H confirmed (*Khim. Prir. Soedin.* 1977, *13*, 810; *Chem. Abstr.* 1978, *88*, 136901 u); two new asparasaponins I and II isolated and characterised as 25(S)-furost-5-ene-3β,22,26-triol-3-O-(2,4-di-α-L-rhamnopyranosyl-β-D-glucopyranoside)-26-O-β-D-glucopyranoside and 25(S)-

furost-5-ene-3β,22,26-triol-3-O-[α-L-rhamnopyranosyl-(1→4)-β-D-glucopyranoside]-26-O-β-D-glucopyranoside respectively (*Agric. Biol. Chem.* 1977, *41*, 1; *Chem. Abstr.* 1977, *86*, 11606 u).

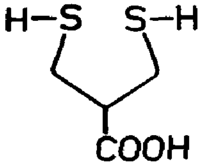
NEW COMPOUNDS



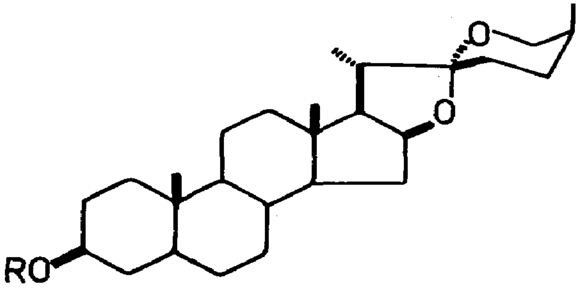


Asparagusic acid

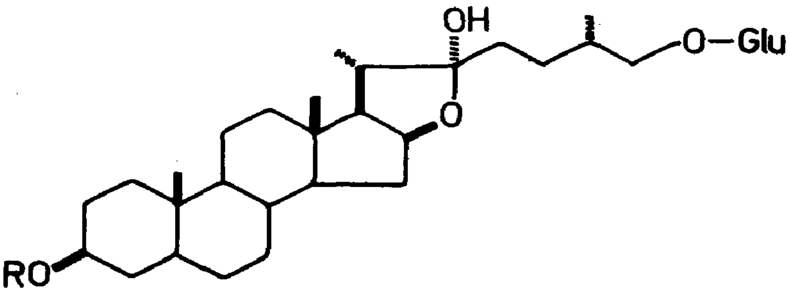
Asparasaponin I
R = Glu[(2→1)Rha](4→1)Rha
Asparasaponin II
R = Glu(4→1)Rha



Dihydroasparagusic acid



Asparagoside A
R = Glu
Asparagoside F
R = Glu[(3→1)Glu](4→1)Glu(4→1)Xyl



Asparagoside B
R = H
Asparagoside H
R = Glu[(3→1)Glu](4→1)Glu(4→1)Xyl

A. racemosus Willd. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 49).

Root extract caused initial increase in force and rate of amphibian heart at lower dose and cardiac arrest at higher dose. It showed hypotension both in normal and spinal cats (*J. Res. Indian Med.* 1971, *6*, 132).

ASPHODELUS (Liliaceae)

A. tenuifolius Cav. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 28).

Lupeol isolated (*J. Inst. Chemists*, Calcutta 1976, *48*, 296; *Chem. Abstr.* 1977, *87*, 18993 g).

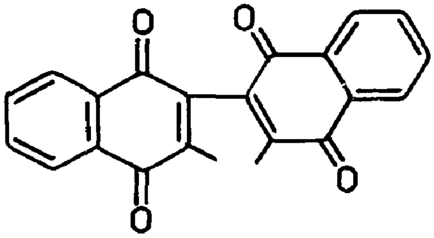
ASPLENIUM (Aspleniaceae)

A. laciniatum D. Don var. *laciniatum*

Octatriacontane, stearic acid, 2-methyl-1,4-naphthoquinone, phthiocol, β-sitosterol and its glucoside isolated (*Curr. Sci.* 1976, *45*, 44); 3,3'-bi-(2-methyl-1,4-naphthoquinone) (I) isolated (*Indian J. Chem.* 1977, *15*B, 394).

Distribution : Himalayas and hills in south India.

NEW COMPOUNDS



I

ASTER (Asteraceae)

A. asperulus (DC.) Nees; see *A. peduncularis* Wall. ex Nees ssp. *peduncularis*

A. peduncularis Wall. ex Nees ssp. *peduncularis* syn. *A. asperulus* (DC.) Nees

Essential oil from leaves showed antibacterial activity (*Indian Perfum.* 1976, *20*, 23; *Chem. Abstr.* 1978, *88*, 110370 v)

Distribution : Western Himalayas from Himachal Pradesh to Kumaon, alt. 1200-2700 m.

A. thomsonii Clarke

Essential oil from leaves showed antibacterial activity (*Indian Perfum.* 1976, *20*, 23; *Chem. Abstr.* 1978, *88*, 110370 v).

Distribution : Western Himalayas from Kashmir to Nepal, alt. 2100-3900 m.

ASTERACANTHA (Acanthaceae)

A. longifolia (L.) Nees; see *Hygrophila auriculata* (K. Schum.) Heine

ASTILBE (Saxifragaceae)

A. rivularis Buch.-Ham. ex D. Don

β-Peltoboykinolic acid (3β-hydroxy-olean-12-en-27-oic acid), 6β-hydroxy-β-peltoboykinolic acid (astilbic acid), acetyl-β-peltoboykinolic acid and bergenin isolated from rhizomes and characterised (*Indian J. Chem.* 1977, *15*B, 494; *Chem. Pharm. Bull.* 1972, *20*, 2106).

Distribution : Himalayas from Kashmir to Bhutan, alt. 1500-2700 m, Meghalaya, alt. 1200-1800 m.

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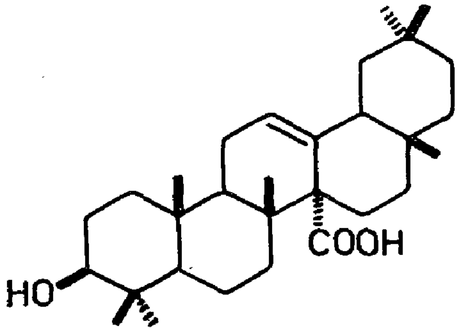


β-Peltoboykinolic acid

ASTRAGALUS (Papilionaceae)

A. graveolens Buch.-Ham. ex Benth.

Sitosterol and ceryl alcohol isolated (*Indian J. Chem.* 1976, *14*B, 475).

Distribution : Himalayas from Kashmir to Kumaon, alt. 1200-3700 m.

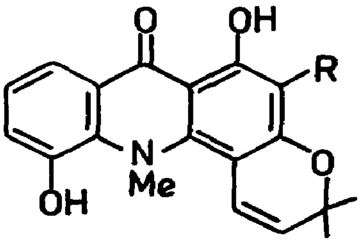
ATLANTIA (Rutaceae)

A. ceylanica (Arn.) Oliv.

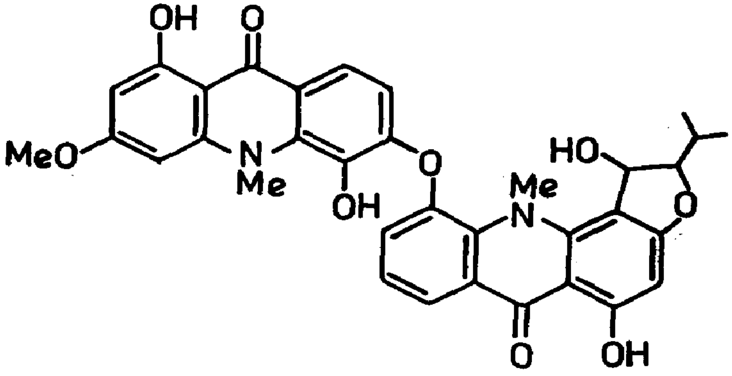
Two acridone alkaloids - 3,12-dihydro-6,11-dihydroxy-3,3,12-trimethylpyrano-[2,3-c]-acridin-7-one (I) and its 5-(3-methyl-2-butenyl) derivative (II) isolated from bark (*J. Chem. Soc.* Perkin 1 1973, 1173); two novel acridone alkaloids - atalanine and ataline - isolated and their structures established (*Chem. Commun.* 1973, 615).

Distribution : Western Peninsula, Konkan and the Nilgiris.

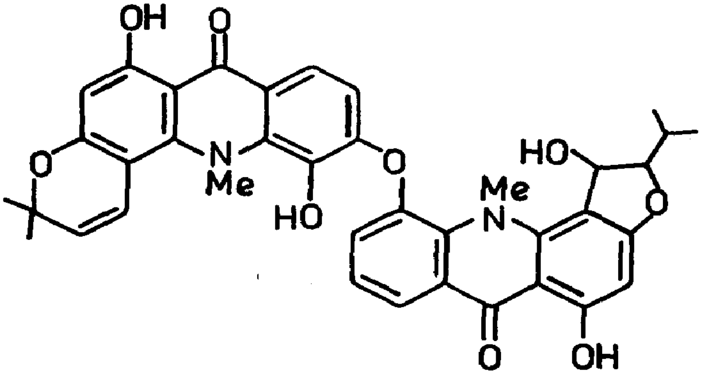
NEW COMPOUNDS



I
R = H
II
R = $CH_2CH=CMe_2$



Atalanine



Ataline

A. missionis (Wt.) Oliver; see *Pamburus missionis* (Wt.) Swingle

A. monophylla (Roxb.) DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 50).

d-α-Bisabolol oxide B isolated (*Indian J. Chem.* 1969, *7*, 1060); a new alkaloid - N-methylbicycloatalaphylline - isolated from root bark (*J. Org. Chem.* 1972, *37*, 3035); two new tetranortriterpenoids, mp. 230° and 234°, and a lactone (I) isolated from root bark along with copaene, α-trans-bergamotene, β-bisabolene, d-α-bisabolol, auraptene, atalaphylline and N-methylatalaphylline; tetranortriterpenoids partly characterised (*Indian J. Chem.* 1975, *13*, 24); a new acridone alkaloid - atalaphyllidine, mp. 222° - isolated from roots and characterised (*Phytochemistry* 1976, *15*, 1303); limonoids - atalantin, dehydroatalantin and cycloepiatalantin - isolated and their structures determined; structure of atalantin revised (*Tetrahedron* 1976, *32*, 2367; *J. Chem. Soc.* Perkin 1 1977, 1875).

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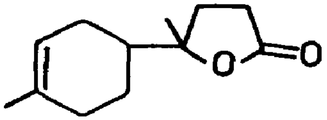
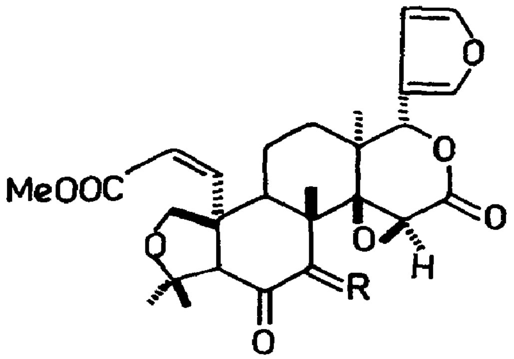
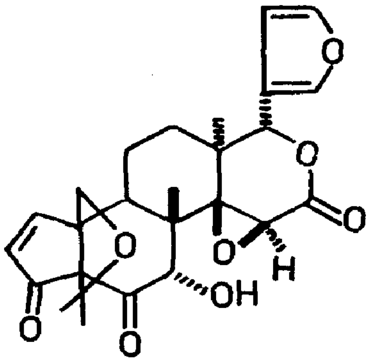


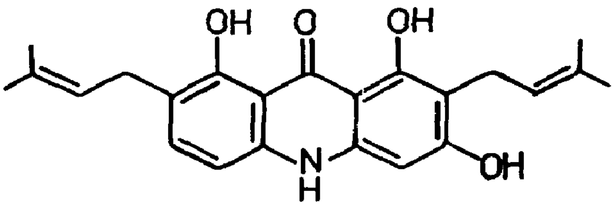
I



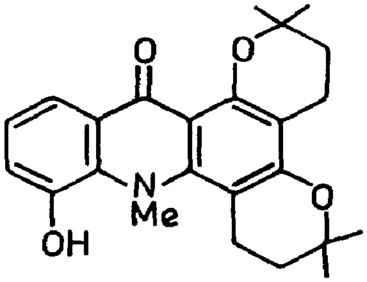
Atalantin
R = H, β-OH
Dehydroatalantin
R = O



Cycloepiatalantin



Atalaphyllidine



N-Methylbicycloatalaphylline

A. wightii Tanaka (Rutaceae)

Leaves yielded lupeol, lupenone and epifriedelinol (*Indian J. Chem.* 1977, *15*B, 291).

Distribution : Western Ghats.

ATROPA (Solanaceae)

A. belladonna L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 50).

Hyoscyamine N-oxide isolated from seeds, roots, leaves and stems (*J. Pharm. Pharmacol.* 1973, *25*, 116); maximum atropine level in plant reached at stage of ripening fruits; scopolamine was highest in young plant; tropane alkaloidal content highest in young leaves at top and poor in leaves at bottom (*Planta Med.* 1977, *31*, 249); pharmacognostic study of leaf; ratio of atropine and scopolamine in total tropine alkaloids of leaf was 0.8 (*Shoyakugaku Zasshi* 1978, *32*, 199; *Chem. Abstr.* 1979, *91*, 9405 x).

BIOLOGICAL ACTIVITY

Scopolamine (1 mg/kg, single dose) markedly increased spontaneous activity of rats which was blocked by α-methyl-p-tyrosine or lithium chloride (*Eur. J. Pharmacol.* 1974, *28*, 344); effect of atropine in rats was similar to that of strychnine or d-tubocurarine and was blocked after eserinisation for 60 min. (*Indian J. Pharmacol.* 1974, *6*, 226); atropine sulphate (40 μg/kg,

i.v.) in pregnant women increased foetal heart rate after 17th week of gestation and the effect increased with increasing gestational time. At all stages of pregnancy maternal heart rate increased about 50 beats/min. (*Zentralbl. Gynaekol* 1978, *100*, 496; *Chem. Abstr.* 1978, *89*, 157535 p).

ATYLOSIA (Papilionaceae)

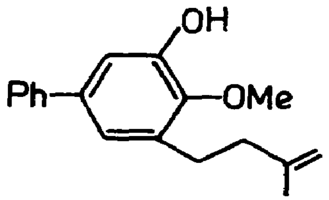
A. candollei W. & A.; see *A. trinervia* (DC.) Gamble

A. trinervia (DC.) Gamble syn. *A. candollei* W. & A.

A new biphenyl derivative - atylosol - isolated together with lupenone, lupeol and sitosterol and its structure determined (*Phytochemistry* 1978, *17*, 2001).

Distribution : The Nilgiris upto 1200 m.

NEW COMPOUNDS



Atylosol

BIOLOGICAL ACTIVITY

Atylosol exhibited antibacterial activity against *Bacillus subtilis* and *Staphylococcus aureus* (*Phytochemistry* 1978, *17*, 2001).

AVENA (Poaceae)

A. sativa L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 31).

Plant tincture reduced craving for cigarettes in man. Pressor response to i.v. administered nicotine in urethan-anaesthetised rats was also antagonised by prior administration of plant extract (*J. Pharm. Pharmacol.* 1975, *27*, 92).

Structures of sugar moieties of avenacines A and B (saponins) determined as glu(1→4)-[glu(1→2]-α-ara- and glu(1→4)glu- respectively; aglycones belonging to oleanene group not characterised (*Tetrahedron* 1973, *29*, 629); 26 flavonoids of apigenin, luteolin and tricin types isolated from leaves, stems and flowers; these include vitexin, isovitexin and isoswertisin 2''-O-arabinosides and di-C(6,8)-glucosylapigenin; isoorientin and its 2''-O-arabinoside, isoorientin-7-O-glucoside and C(6)-glucosylchrysoeriol; tricin and its 4'- and 7-O-glucosides (*Pflanzen Physiol.* 1977, *85*, 103; *Chem. Abstr.* 1977, *87*, 197316 h; *Phytochemistry* 1977, *16*, 1112, 2041); seed globulin separated by gel electrophoresis into two major α- and β-subunits which were present in equimolar amounts; α-subunit contained more basic amino acids and less glutamic acid, glutamine and glycine than β-subunit (*Plant Physiol.* 1978, *62*, 506; *Chem. Abstr.* 1979, *90*, 19062 b).

A. sikkimensis Hook.f.; see *Trisetum flavescens* (L.) P. Beauv.

AVICENNIA (Avicenniaceae)

A. alba Blume syn. *A. officinalis* L. var. *alba* (Blume) Clarke

Taraxerol, β-amyrin, taraxerone, betulin, betulinic acid and triacontanol isolated from bark and leaves (*J. Indian Chem. Soc.* 1979, *56*, 111).

Distribution : Coastal regions of India.

A. marina (Forsk.) Vierh. syn. *A. officinalis* sensu Clarke, p.p. (non L.) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 31).

Taraxerol, β-amyrin, taraxerone, betulin, betulinic acid and triacontanol isolated from bark and leaves (*J. Indian Chem. Soc.* 1979, *56*, 111); β-sitosterol, lupeol, lupenone, friedelin, betulinic and ursolic acids from aerial parts (*Indian J. Pharm.* 1974, *36*, 105).

A. officinalis L. syn. *A. tomentosa* auct. (non Jacq.), *A. officinalis* sensu Clarke, p.p. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 31).

β-Amyrin, taraxerol, taraxerone, betulin, betulinic acid and triacontanol isolated from bark and leaves (*J. Indian Chem. Soc.* 1979, *56*, 111).

Note: *A. tomentosa* Jacq. given in the Glossary, is tropical American plant for which the correct name is *A. germinans* (L.) Stearn.

A. officinalis L. var. *alba* (Blume) Clarke; see *A. alba* Blume

A. officinalis Clarke; see *A. marina* (Forsk.) Vierh.

A. tomentosa Jacq.; see *A. officinalis* L.

AZADIRACHTA (Meliaceae)

A. indica (L.) A. Juss. syn. *Melia azadirachta* L., *M. indica* Brandis (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 50).

Aqueous extract showed hypoglycaemic and antihyperglycaemic activities in dogs (*Indian J. Pharmacol.* 1978, *10*, 247).

A new tetranortriterpene - nimbidinin - isolated from amorphous bitter principle (nimbin) of seeds and characterised; nimbidic acid found identical to salannic acid (*Tetrahedron Lett.* 1970, 2761; *Phytochemistry* 1971, *10*, 857); limonoids - azadirone, azadiradione and epoxyazadiradione, mp. 202°, $[\alpha]_D$ +4°, - isolated and structures elucidated (*Tetrahedron* 1971, *27*, 3927; *Z. Naturforsch.* 1975, *30B*, 961; *Chem. Abstr.* 1976, *84*, 74458 m); β-sitosterol-β-D-glucoside, n-hexacosanol, β-carotene from leaves (*Phytochemistry* 1971, *10*, 2842); a new myricetin glycoside - melicitrin - along with quercetin-3-galactoside and kaempferol-3-glucoside isolated from flowers and characterised as myricetin- 3′-L-arabinoside (*Indian J. Chem.* 1972, *10*, 452); a triterpenoid - azadirachtin - isolated from fruits (*Phytochemistry* 1973, *12*, 391); kulinone, kulactone, kulolactone and methyl kulonate isolated from bark (*Tetrahedron* 1973, *29*, 1911); 6β-hydroxy-4-stigmasten-3-one (I) and 6β-hydroxy-4-campes-

ten-3-one (II) isolated from bark and their structures confirmed by partial synthesis (*Phytochemistry* 1973, *12*, 903); a new hexacyclic tetranortriterpenoid - vilasinin - isolated and structure established (*Chem. Lett.* 1974, 357; *Chem. Abstr.* 1974, *80*, 146356 u); β-sitosterol and 24-methylenecycloartanol from heartwood (*Indian J. Appl. Chem.* 1970, *33*, 384; *Chem. Abstr.* 1974, *80*, 45618 a); two new meliacins - melianin A and melianin B - isolated from wood and their structures determined; cycloeucalenone, fraxinellone, azedaric acid, nimbolin A, gedunin, 7-deacetyl-7-oxogedunin also isolated (*J. Chem. Soc.* Perkin 1 1975, 1352).

Stereostructure of melianone, having 23R,24S configuration, established (*Chem. Commun.* 1975, 517); isolation and characterisation of an isomer of epoxyazadiradione, [α]D - 72°, from fruit pulp (*Chem. Ztg.* 1975, *99*, 504; *Chem. Abstr.* 1976, *84*, 86739 s); quercetin-3-O-L-rhamnoside and quercetin-3-O-rutinoside isolated from leaves (*Indian J. Chem.* 1975, *13*, 527); azadirachtin and salanin isolated from berries; structure of former established (*Recent Adv. Phytochem.* 1975, *9*, 283; *Chem. Abstr.* 1977, *87*, 102473 v); β-sitosterol-O-D-glucoside, 4,14α-dimethyl-5α-ergosta-8,24(28)-dien-3β-ol and 4α-methyl-α-ergosta-8,24(28)-dien-3β-ol isolated from heartwood (*Fitoterapia* 1977, *48*, 166; *Chem. Abstr.* 1978, *88*, 16646 q); structure of a new compound - 17β-hydroxyazadiradione - isolated from fruit pulp (*Tetrahedron Lett.* 1978, 611); 24-methylenecycloartanone, cycloeucalenone, 24-methylenecycloartanol, cycloeucalenol, 4-stigmasten-3-one, 4-campesten-3-one, triacontanol, vanillic aldehyde, trans-cinnamic acid and vanillic acid from roots; 21,23:24,25-diepoxytirucall-7-en-21-ol isolated from fruits (*Planta Med.* 1979, *35*, 76); structures of two new constituents - 17-epi-azadiradione and 17β-hydroxyazadiradione (*Tetrahedron Lett.* 1978, 2395); isolation of a glycopeptide by pronase digestion of neem gum; it contained arabinose, galactose and glucosamine in ratio of 2.69:2.0:4.9 and asparagine, serine, threonine, arginine, proline, valine, phenylalanine and tyrosine (*Indian J. Biochem. Biophys.* 1978, *15*, 449; *Chem. Abstr.* 1979, *91*, 2516a); scopoletin, 6-hydroxy-7-methoxycoumarin, aesculetin, cinnamic acid, β-sitosterol, campesterol and two unidentified sterols isolated (*Pharmazie* 1979, *34*, 106; *Chem. Abstr.* 1979, *91*, 16707 a); isolation of tiglic acid from oil (*Indian J. Chem.* 1979, *17*B, 169).

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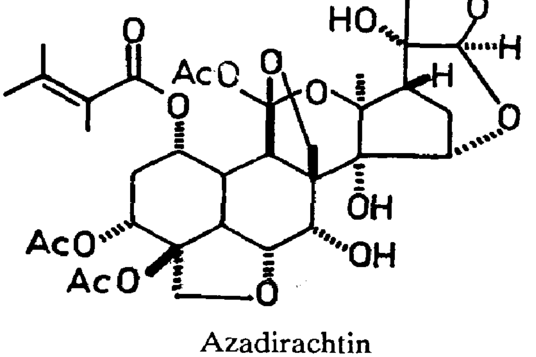
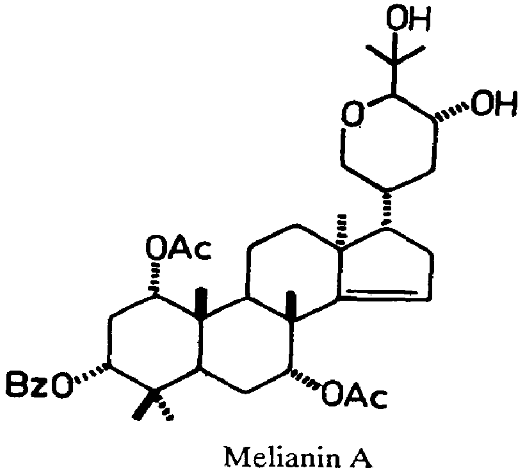
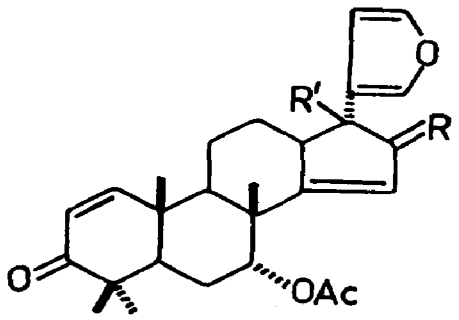


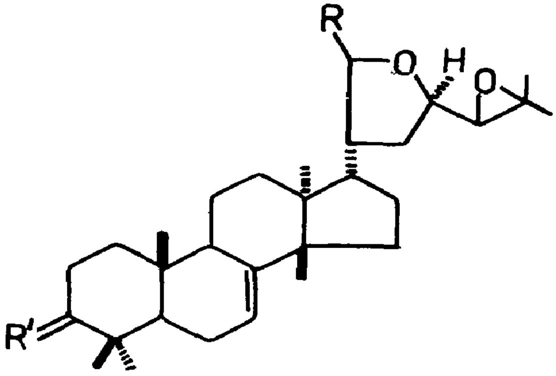
Azadirachtin



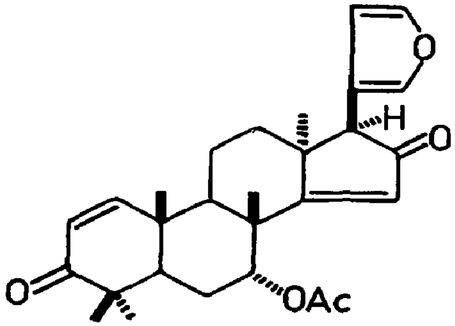
Melianin A



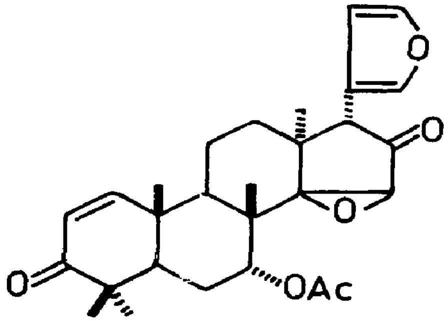
Azadirone
R = H,H, R′ = H
Azadiradione
R = O, R′ = H
17β-Hydroxy-azadiradione
R = O, R′ = β-OH



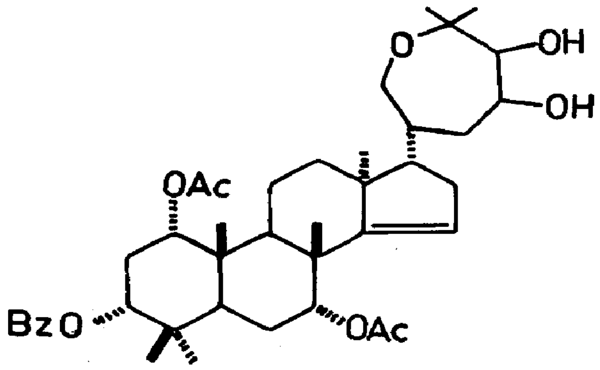
Melianone
R = α-OH, R′ = O
21,23:24,25-Diepoxytirucall-7-en-21-ol
R = OH, R′ = H, H



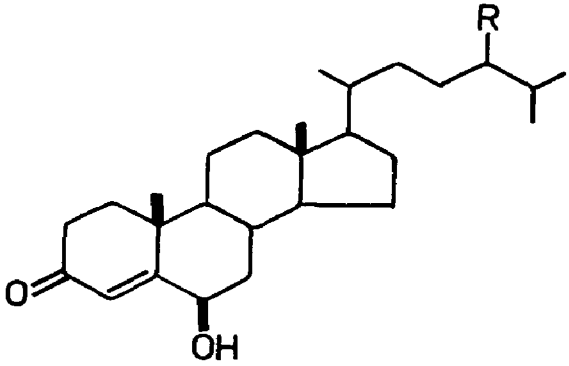
17-Epi-azadiradione



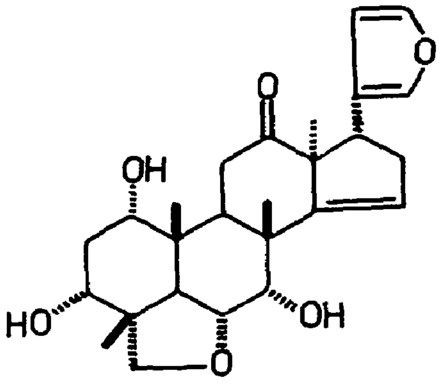
Epoxyazadiradione



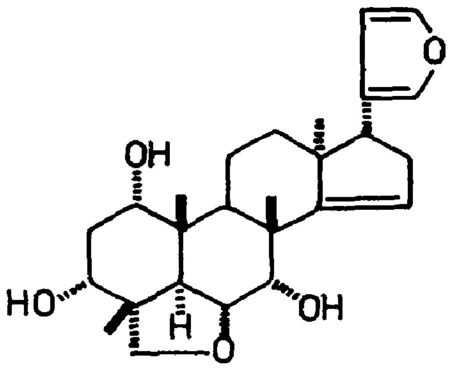
Melianin B



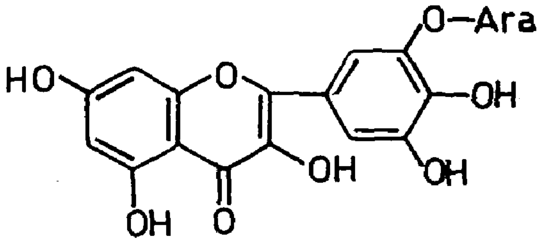
I
R = C_2H_5
II
R = Me



Nimbidinin



Vilasinin



Melicitrin

BIOLOGICAL ACTIVITY

Sodium nimbinate possessed potent anti-inflammatory activity in carrageenin-induced oedema and formaldehyde-induced arthritis (*Indian J. Med. Res.* 1970, *58*, 724); azadirachtin showed feeding and growth disruptive effects on certain insects (*Phytochemistry* 1973, *12*, 391).

Nimbidin at 20 mg/kg dose showed significant antiulcer activity in Shay rats and histamine ulcers in guinea pigs. Same dose had significant antipeptic activity in rats and guinea pigs. However, nimbidin 40 mg/kg possessed antisecretory effect in Shay rats (*Indian J. Med. Res.* 1978, *68*, 169).

AZIMA (Salvadoraceae)

A. tetracantha Lam. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 52).

Friedelin, glutinol, lupeol and β-sitosterol isolated from leaves (*Curr. Sci.* 1978, *47*, 857).

BACCAUREA (Euphorbiaceae)

B. courtallensis (Wt.) Muell.-Arg.

Stigmasterol isolated from bark (*Indian J. Chem.* 1977, *15*B, 291).

Distribution : Western Ghats, from North Kanara southwards.

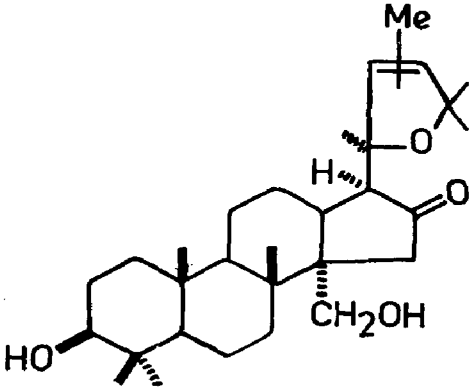
BACOPA (Scrophulariaceae)

B. monnieri (L.) Wettst. syn. *Herpestis monniera* (L.) H. B. & K. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 53).

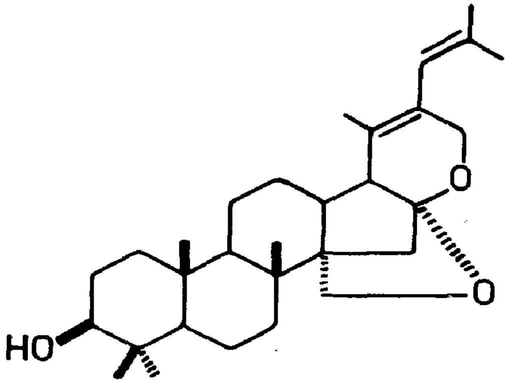
Plant extract showed significant barbiturate hypnosis potentiation in rats (*J. Res. Indian Med. Yoga & Homoeo*, 1979, *14*, 1).

Nicotine, 3-formyl-4-hydroxy-2H-pyran, luteolin and luteolin-7-glucoside isolated (*Phytochemistry* 1972, *11*, 2649); bacogenin A_1 obtained from acid hydrolysate of bacoside A, characterised as 3,18-dihydroxy-20→25-epoxy-22(or 23)-methyl-24-nor-dammar-22-en-16-one (*Phytochemistry* 1973, *12*, 887; *ibid.* 1978, *17*, 287); bacogenin A_4, mp. 175°, obtained from acid hydrolysate of bacoside A identified as ebelin lactone (*Phytochemistry* 1973, *12*, 2074; *ibid.* 1978, *17*, 287); bacogenin A_2 characterised as isomer of bacogenin A_1 differing either in configuration at C-20 or disposition of vinylic Me in sidechain (*Phytochemistry* 1974, *13*, 1205); isolation and structure of bacogenin A_3 (*Phytochemistry* 1977, *16*, 141); structure and absolute configuration of jujubogenin and pseudojujubogenin obtained by degradation of bacoside A (*Phytochemistry* 1978, *17*, 287).

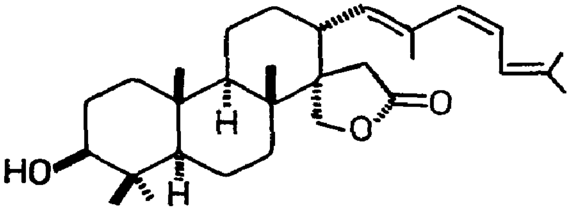
NEW COMPOUNDS



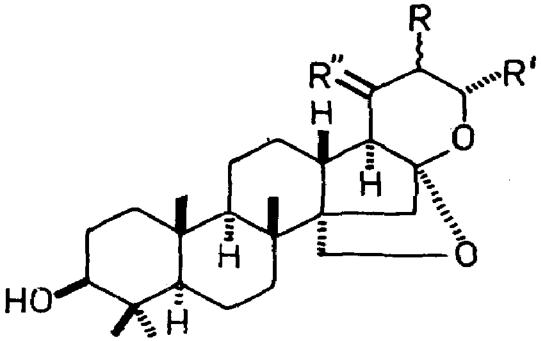
Bacogenin A_1



Bacogenin A_3



Bacogenin A_4



Jujubogenin

R = H, R′ = CH=CMe₂, R′′ = α-Me, β-OH

Pseudojujubogenin

R = CH=CMe₂, R′ = H, R′′ = Me,OH

BIOLOGICAL ACTIVITY

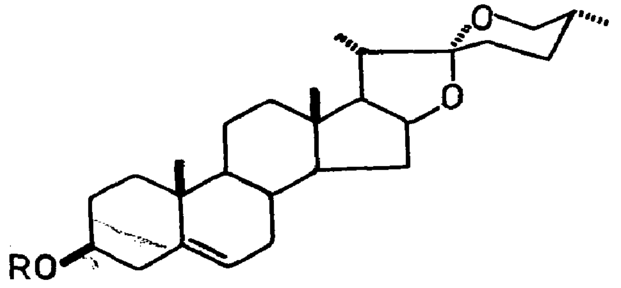
Saponins showed significant change in locomotor activity and learning behaviour of normal rats and also significant barbiturate hypnosis potentiation (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 1).

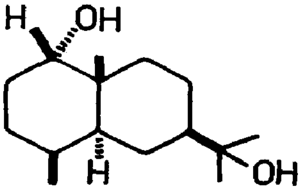
BALANITES (Balanitaceae)

B. aegyptiaca (L.) Delile syn. *B. roxburghii* Planch. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 54).

Nitogenin glucoside isolated (*Phytochemistry* 1971, *10*, 2829); diosgenin and stigmasterol from leaves (*Indian J. Pharm.* 1975, *37*, 103); isolation and structure of saponins - balanitisines A,B,C,D and E - from fruits (*Indian J. Pharm.* 1977, *39*, 125; *Indian J. Pharm. Sci.* 1979, *41*, 122); diosgenin content of fruit (0.944), pericarp (0.094), defatted seed (0.4) and oil (0.54%) determined (*East. Pharm.* 1978, *21*, 191; *Chem. Abstr.* 1978, *89*, 160159 z); isolation and structure elucidation of balanitol from bark (*J. Indian Chem. Soc.* 1978, *55*, 1148).

NEW COMPOUNDS





Balanitol

Balanitisine A
R = Glu[(4→1)Rha](3→1)Glu
Balanitisine B
R = Glu, Rha
Balanitisine C
R = Glu:Rha(1:3)
Balanitisine D
R = Glu, Rha
Balanitisine E
R = Glu:Ara:Xyl:Rha(4:1:2:2)

B. roxburghii Planch.; see *B. aegyptiaca* (L.) Delile

BALIOSPERMUM (Euphorbiaceae)

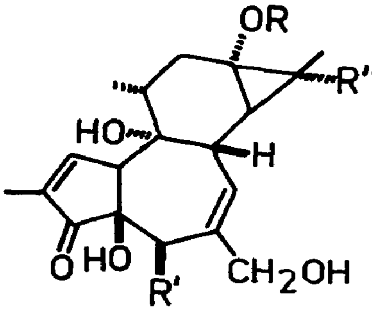
B. axillare Blume; see *B. montanum* (Willd.) Muell.-Arg.

B. montanum (Willd.) Muell.-Arg. syn. *B. axillare* Blume (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 32).

Pharmacognostic study of stem, leaf and root (*J. Res. Indian Med.* 1971, *6*, 199).

New phorbol esters - montanin, 12-deoxyphorbol-13-palmitate, baliospermin, 12-deoxy-5β-hydroxyphorbol-13-myristate and 12-deoxy-16-hydroxyphorbol-13-palmitate - isolated from roots; structures determined by spectral studies (*Planta Med.* 1978, *33*, 128).

NEW COMPOUNDS



12-Deoxyphorbol-13-palmitate

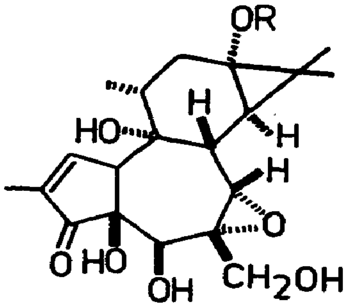
R = $CO(CH_2)_{14}Me$, R′,R″ = H

12-Deoxy-5β-hydroxyphorbol-13-myristate

R = $CO(CH_2)_{12}Me$, R′ = OH, R″ = H

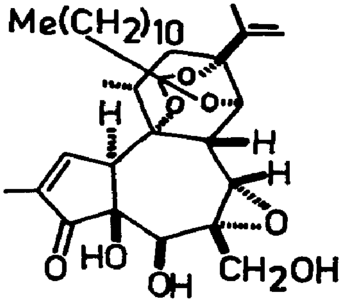
12-Deoxy-16-hydroxyphorbol-13-palmitate

R = $CO(CH_2)_{14}Me$, R′ = H, R″ = OH



Baliospermin

R = $CO(CH_2)_{10}Me$



Montanin

BIOLOGICAL ACTIVITY

All the five phorbol esters showed ED50 0.06-3.4μg/ml against *Lymphocytic leukaemia* P-388 *in vitro.*

BALSAMODENDRON (Burseraceae)

B. mukul Hook. ex Stocks; see *Commiphora wightii* (Arnott) Bhandari

B. myrrha Nees; see *Commiphora myrrha* (Nees) Engl.

B. pubescens Stocks; see *Commiphora stocksiana* (Engl.) Engl.

BAMBUSA (Poaceae)

B. vulgaris Schrad. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 33).

A cyanogen - taxiphyllin - along with β-sitosterol, campesterol, stigmasterol, 4-hydroxybenzaldehyde and L-asparagine isolated from shoot (*Chem. Ber.* 1976, *109*, 3379).

BANISTEREOPSIS (Malpighiaceae)

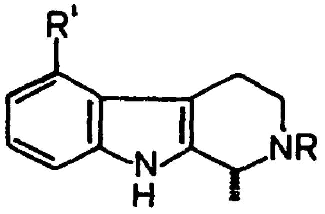
B. argentea Spring ex Juss.

An alkaloid fraction (1-3 mg/kg, i.p.) exhibited nonspecific spasmolytic action, histamine release-mediated pressor response and behavioural effects in mice and rats (*J. Pharm. Sci.* 1971, *60*, 1209); (+)Nb-methyltetrahydroharman, (+)5-methoxytetrahydroharman, har-

maline, N,N-dimethyltryptamine and its Nb-oxide isolated from leaves and stems (*Phytochemistry* 1971, *10*, 2840; *J. Pharm. Sci.* 1971, *60*, 1209).

Distribution : Indian Botanical Gardens, Howrah, ornamental plant.

NEW COMPOUNDS



(+)Nb-Methyltetrahydroharman
R = Me, R' = H
5-Methoxytetrahydroharman
R = H, R' = Me

BARLERIA (Acanthaceae)

B. ciliata Roxb.; see *B. cristata* L.

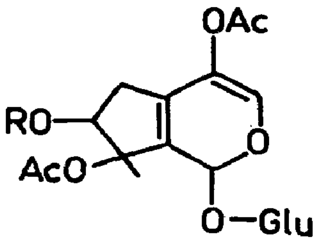
B. cristata L. syn. *B. ciliata* Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 33).

Apigenin, naringenin and apigenin glucuronide isolated from flowers (*J. Indian Chem. Soc.* 1972, *49*, 825).

B. prionitis L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 33).

Scutellarein-7-rhamnosylglucoside isolated from flowers (*Phytochemistry* 1971, *10*, 2822); *structures of new iridoids - barlerin and acetylbarlerin - isolated from leaves and stems* (*Tetrahedron Lett.* 1975, 1995).

NEW COMPOUNDS



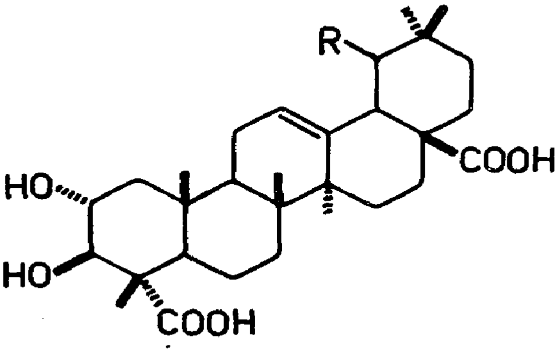
Acetylbarlerin
R = Ac
Barlerin
R = H

BARRINGTONIA (Barringtoniaceae)

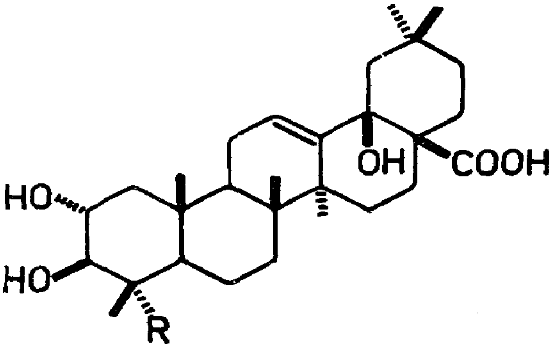
B. acutangula (L.) Gaertn. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 54).

A new triterpene - barrinic acid - isolated and characterised (*J. Indian Chem. Soc.* 1972, *49*, 519); structure of barrigenic acid isolated from fruits (*Phytochemistry* 1976, *15*, 1780); revised structure of barringtogenol B (sapogenol A) proposed (*Trans. Bose Res. Inst.*, Calcutta 1976, *39*, 29; *Chem. Abstr.* 1977, *87*, 117970 d); a new trihydroxytriterpene acid - acutangulic acid - isolated in addition to stigmasterol-β-D-glucoside and barringtogenic acid from leaves (*Curr. Sci.* 1976, *45*, 518; *J. Indian Chem. Soc.* 1978, *55*, 1169); a new triterpene - tangulic acid - isolated along with β-amyrin, β-sitosterol, stigmasterol and oleanolic acid (*J. Indian Chem. Soc.* 1978, *55*, 1169).

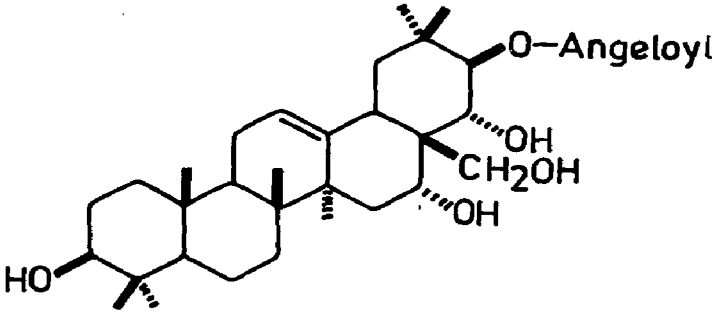
NEW COMPOUNDS



Barrinic acid
R = α-OH
Barrigenic acid
R = β-OH



Acutangulic acid
R = Me
Tangulic acid
R = COOH



Barringtogenol B

BARTSIA (Scrophulariaceae)

B. odontites Hook.f.; see *Odontites serotina* (Lam.) Dum.

BASSIA (Sapotaceae)

B. butyracea Roxb.; see *Madhuca butyracea* (Roxb.) Macbride

B. latifolia Roxb.; see *Madhuca longifolia* (Koen.) Macbride

B. longifolia Koen.; see *Madhuca longifolia* (Koen.) Macbride

B. neriifolia (Moon); see *Madhuca neriifolia* (Moon) H.J. Lam

BAUHINIA (Caesalpiniaceae)

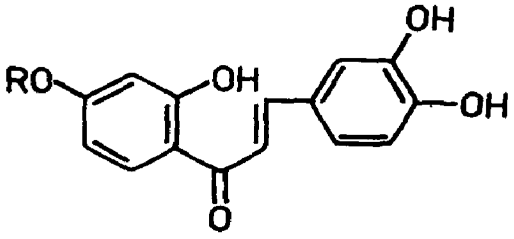
B. malabarica Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 34).

Quercitroside, isoquercitroside and rutoside isolated (*Plant Med. Phytother*, 1977, *11*, 213; *Chem. Abstr.* 1978, *88*, 148934 v).

B. purpurea L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 55).

Pelargonidin-3-glucoside and pelargonidin-3-triglucoside isolated from flowers (*Vijnana Parishad Anusandhan Patrika* 1978, *21*, 177; *Chem. Abstr.* 1979, *90*, 18171 g); a new chalcone - butein-4'-O-L-arabinopyranosyl-O-β-D-galactoside (I) - isolated and characterised (*Phytochemistry* 1979, *18*, 689).

NEW COMPOUNDS



I

R = Glu(4→1)Ara

B. retusa Ham. ex Roxb. (non Poir.); see *B. roxburghiana* Voigt

B. roxburghiana Voigt syn. *B. retusa* Ham. ex Roxb. (non Poir.) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 35).

Quercetin-3-O-β-D-glucoside and rutin isolated from bark (*Proc. Nat. Acad. Sci.* India 1978, *48*A, 183; *Chem. Abstr.* 1979, *91*, 207390 b).

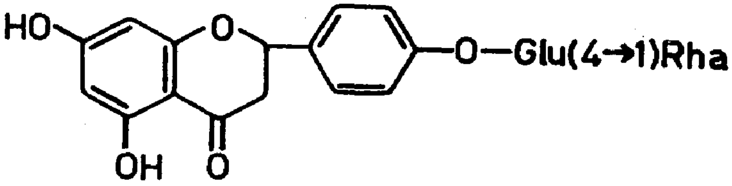
B. vahlii Wt. & Arn. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 35).

Quercitroside, isoquercitroside and rutoside isolated from plant; kaempferol glycosides also present in flowers (*Plant. Med. Phytother.* 1977, *11*, 213; *Chem. Abstr.* 1978, *88*, 148934 v).

B. variegata L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 35).

Quercitroside, isoquercitroside and rutoside isolated from plant; myricetol glycosides in seeds and kaempferol glycosides in flowers also present (*Plant. Med. Phytother.* 1977, *11*, 213; *Chem. Abstr.* 1978, *88*, 148934 v); 5,7-dihydroxyflavanone-4'-O-α-L-rhamnopyranosyl-β-D-glucopyranoside (I) isolated from stem (*Indian J. Chem.* 1979, *18*B, 85).

NEW COMPOUNDS



I

BENINCASA (Cucurbitaceae)

B. cerifera Savi; see *B. hispida* (Thunb.) Cogn.

B. hispida (Thunb.) Cogn. syn. *B. cerifera* Savi (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 35).

Detection of β-sitosterol, lupeol, n-triacontanol, mannitol, arginine, aspartic acid, glutamic acid, asparagine, glutamine, proline, hydroxyproline, isoleucine, cysteine, L-leucine, glucose and rhamnose in fruits by TLC (*Quart. J. Crude Drug Res.* 1976, *14*, 163; *Chem. Abstr.* 1977, *87*, 65372 p).

BENTHAMIDIA (Cornaceae)

B. capitata (Wall.) Hara syn. *Cornus capitata* Wall.

H. - Bhamor, Tharmal, Thorbal; Assam - Dieng-sohjaphon.

Comin and phlorin isolated from leaves and twigs (*Phytochemistry* 1973, *12*, 2301).

Distribution : Himalayas from Himachal Pradesh to Bhutan, alt. 1200-2500 m and Assam

BERBERIS (Berberidaceae)

B. acanthifolia Wall.; see *Mahonia acanthifolia* G. Don

B. concinna Hook.f.

Berberine and palmatine isolated as tetrahydro derivatives from stem bark (*Proc. Nat. Acad. Sci.* India 1977, *47*A, 93; *Chem. Abstr.* 1978, *89*, 176334 p); 9,9-dimethyltetracosan-6-one isolated from stem bark and identified by spectral studies (*Proc. Nat. Acad. Sci.* India 1978, *48*A, 76; *Chem. Abstr.* 1979, *91*, 210852 j).

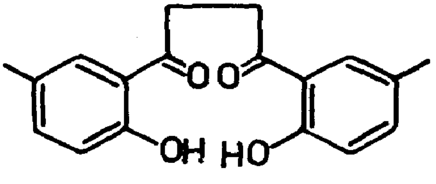
Distribution : Nepal and Sikkim Himalayas, alt. 2800-4400 m.

B. coriaria Royle ex Lindl.

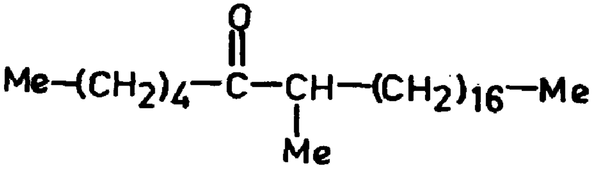
1,4-Bis-(2′-hydroxy-5′-methylphenyl)-butan-1,4-dione (I) isolated and characterised (*Phytochemistry* 1978, *17*, 1439); a new ketone - 7-methyltetracosan-6-one (II) - along with berberine isolated from stem bark (*J. Indian Chem. Soc.* 1979, *56*, 310).

Distribution : Himalayas from Garhwal to Nepal, alt. 2000-2700 m.

NEW COMPOUNDS



I

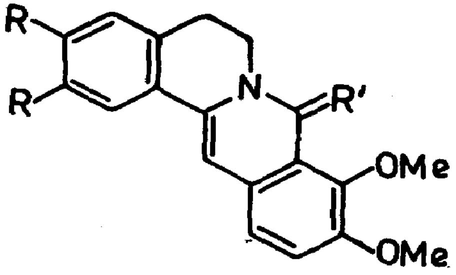


II

B. lycium Royle (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 56).

Two artefact alkaloids - berberine-chloroform, palmatine- chloroform - along with oxyberberine isolated from roots (*Phytochemistry* 1973, *12*, 1822); umbellatine, berberine and berbamine identified in roots (*Pakistan J. For.* 1978, *28*, 25; *Chem. Abstr.* 1979, *90*, 43706 k).

NEW COMPOUNDS



Berberine-chloroform
R,R = $-OCH_2O-$, R′ = H,CCl_3
Palmatine-chloroform
R,R = OMe, R′ = H,CCl_3
Oxyberberine
R,R = $-OCH_2O-$, R′ = O

BIOLOGICAL ACTIVITY

Berberine produced sedation in mice and conscious cats, and potentiated phenobarbitone sleeping time. It (5 mg/kg, i.p.) did not show any tranquillising, anticonvulsant or analgesic activity (*Jap. J. Pharmacol.* 1970, *20*, 482); berberine sulphate at 100 mg/kg administered 10 days after experimental production of intestinal amoebiasis was effective in 80% of rats; at 1-10 μg/ml it provoked spasmogenic response in isolated guinea pig ileum; at 20-100 μg/ml it had a spasmolytic effect. It blocked responses to acetylcholine in both isolated guinea pig ileum and frog rectus muscle (*Jap. J. Pharmacol.* 1972, *22*, 11); berberine sulphate (3-30 mg/kg,

s.c.) along with cholera toxin (10 or 30 mg, s.c.) dose-relatedly inhibited toxin-induced inflammation in neck of rats. Berberine sulphate 30 mg/kg, i.p. also showed anti- inflammatory activity (*Indian J. Med. Res.* 1977, *65*, 133); acute doses of berberine chloride in rats increased secretion of bilirubin, UDP-glucuronyltransferase activity and BSP clearance (*Comp. Med. East West* 1977, *5*, 161; *Chem. Abstr.* 1978, *88*, 182894 s); berberine sulphate produced reversible hypotension in anesthetised rat which was not inhibited by aprotinin. It influenced gastric acidity, fluid volume and ulceration in Shay rats and histamine-induced gastric hypersecretion in anaesthetised dogs. It decreased urine volume and urinary concentration of Na+ and creatinine in anaesthetised dogs. It showed antipyretic activity in rat and was three times as effective as sodium salicylate. It consistently increased amplitude of contraction of beating isolated atria of rabbit and guinea pig. In isolated guinea pig ileum smaller doses of berberine sulphate potentiated spasmogenic actions of prostaglandins (*Indian J. Physiol. Pharmacol.* 1978, 22, 9).

B. pachyacantha Koehne syn. *B. thunbergii* DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 56).

Pelargonidin-3-glucoside and cyanidin-3-glucoside isolated (*Hort. Science* 1974, *9*, 40; *Chem. Abstr.* 1974, *80*, 118248 s).

B. petiolaris Wall. ex G. Don (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990. p. 56).

Berbamine, berberine and palmatine isolated from roots (*Pakistan J. Sci. Ind. Res.* 1970, *13*, 49; *Chem. Abstr.* 1970, *73*, 119192 n).

B. thunbergii DC.; see *B. pachyacantha* Koehne

B. vulgaris L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 57).

Detection of tannin (5.56), carbohydrates (5.82), organic acids (3.69), Mn (7.20) and pectic substances (0.48%) and vitamin C 156.50 mg in berries (*Farm. Zh.* 1973, *28*, 84; *Chem. Abstr.* 1973, *79*, 134326 a).

BERGENIA (Saxifragaceae)

B. ciliata (Haw.) Sternb. forma *ligulata* Yeo syn. *B. ligulata* (Wall.) Engl., *Saxifraga ligulata* Wall. var. *ciliata* (Royle) Hook.f. & Thomas., *S. ciliata* Royle (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 57).

(-)Afzelechin isolated from roots (*Ann. Ist Super. Sanita* 1969, *5*, 555; *Chem. Abstr.* 1970, *73*, 117127 v); saxin isolated from roots was identified as bergenin (*Pakistan J. Sci. Ind. Res.* 1972, *15*, 87; *Chem. Abstr.* 1973, *78*, 71951 g); bergenin, its C-glycoside, β-sitosterol and (+)catechin-3-gallate isolated from roots (*Indian J. Chem.* 1974, *12*B, 1038).

B. ligulata (Wall.) Engl.; see *B. ciliata* (Haw.) Sternb. forma *ligulata* Yao

B. stracheyi (Hook.f. & Thoms.) Engl.

H. - Pasanbhed.

Bergenin, its C-glycoside, β-sitosterol and catechin-3-gallate isolated from roots (*Indian J. Chem.* 1974, *12*, 1038).

Distribution : Himalayas from Kashmir to Kumaon, alt. 2400-4200 m.

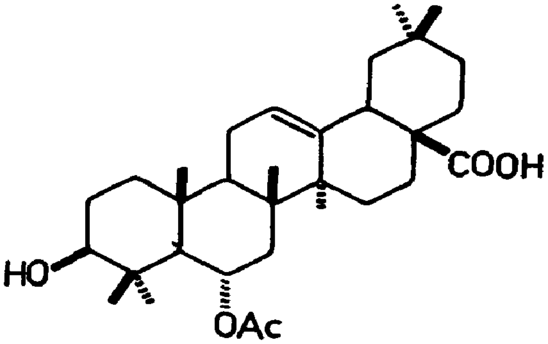
BETULA (Betulaceae)

B. utilis D. Don (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 57).

Bark extract used as an antiseptic.

Lupeol, betulin, oleanolic acid and betulic acid isolated from bark (*Phytochemistry* 1973, *12*, 214); isolation and structure of karachic acid from bark (*Pakistan J. Sci. Ind. Res.* 1975, *17*, 195; *Chem. Abstr.* 1976, *84*, 135869 v).

NEW COMPOUNDS



Karachic acid

BIDENS (Asteraceae)

B. cernua L.

Butin-7-O-β-D-glucopyranoside, isoocanin-7-O-β-D-glucopyranoside, quercitrin, sulfurein and maritimein isolated (*Khim. Prir. Soedin.* 1979, *15*, 229; *Chem. Abstr.* 1979, *91*, 207396 h).

Distribution : Kashmir and Himachal Pradesh, alt. 1500-1800 m.

B. tripartita L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 57).

Luteolin, luteolin-7-O-β-D-glucopyranoside and two compounds, mp. 165° and 236° - isolated (*Khim. Prir. Soedin.* 1972, *8*, 121; *Chem. Abstr.* 1972, *77*, 58828 g); a new flavonoid - butein-7-O-β-D-glucopyranoside - along with butin-7-O-β-D-glucopyranoside(isocoreopsin), mp. 165°, 2,3′,4,4′-tetrahydroxychalcone, mp. 213° and 3′,4′,6-trihydroxyaurone, mp. 280°, isolated (*Khim. Prir. Soedin.* 1972, *8*, 440; *Chem. Abstr.* 1973, *78*, 1987 z; *Farm. Zh. Kiev* 1975, *30*, 88; *Chem. Abstr.* 1975, *83*, 128660 w); 6,7-dihydroxycoumarin, umbelliferone and scopoletin isolated (*Khim. Prir. Soedin.* 1972, *8*, 668; *Chem. Abstr.* 1973, *78*, 94851 p).

BIGNONIA (Bignoniaceae)

B. adenophylla Wall. ex G. Don; see *Fernandoa adenophylla* (Wall. ex G. Don) V. Steenis

B. diversifolia H. B. & K.
Stigmasterol and ursolic acid isolated (*J. Indian Chem. Soc.* 1969, *46*, 951).
Distribution : Native of Mexico, grown in Indian gardens as ornamental.

B. gracilis Lodd.; see *B. unguis-cati* L.

B. megapotanica Spreng.
Quercetin-3-rutinoside and quercetin-3-galactoside isolated from leaves (*Phytochemistry* 1972, *11*, 1499).
Distribution : Native of Brazil and tropical America, grown in gardens as ornamental.

B. unguis-cati L. syn. *B. gracilis* Lodd.
Quercetin-3-rutinoside isolated from leaves (*Phytochemistry* 1972, *11*, 1499).
Distribution : Native of tropical America, grown in gardens as ornamental.

B. venusta Ker-Gawl.; see *Pyrostegia venusta* (Ker-Gawl.) Miers

BIOTA (Cupressaceae)

B. orientalis Endl.; see *Thuja orientalis* L.

BISCHOFIA (Euphorbiaceae)

B. javanica Blume (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 37).
Epifriedelinol acetate, friedelin and β-sitosterol isolated from bark (*J. Indian Chem. Soc.* 1969, *46*, 757).

BIXA (Bixaceae)

B. orellana L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 58).
Tetracyclic sesquiterpene - ishwarane - from leaf oil (*Phytochemistry* 1973, *12*, 2995).

BLAINVILLEA (Asteraceae)

B. acmella (L.) Philip. syn. *B. latifolia* (L.f.) DC. ex Wight
Stigmasterol, α-amyrin acetate and β-amyrin acetate isolated from triterpenoid fraction (*Phytochemistry* 1972, *11*, 3544).
Distribution : Upper Gangetic plain, western and peninsular India.

B. latifolia (L.f.) DC. ex Wight; see *B. acmella* (L.) Philip.

BLEPHARIS (Acanthaceae)

B. edulis Pers.; see *B. persica* (Burm.) O. Kuntze

B. persica (Burm.) O. Kuntze syn. *B. edulis* Pers. (*Compend. Indian Med. Plants*, Vol. 1, New Delhi, 1990, p. 58).

Blephargenin, mp. 210°, and β-sitosterol-β-D-glucoside isolated from seeds (*J. Res. Indian Med.* 1973, *8*, 27).

BLIGHIA (Sapindaceae)

B. sapida Koen. & Sims. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 59).

Improved isolation precedure for obtaining hypoglycins A and B (*J. Pharm. Pharmacol.* 1974, *26*, 639).

BLUMEA (Asteraceae)

B. lacera (Burm. f.) DC. syn. *B. subcapitata* DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 38).

Essential oil showed analgesic, hypothermic and tranquillising activities (*Indian J. Pharmacol.* 1976, *8*, 7).

Campesterol isolated from aerial parts (*Phytochemistry* 1972, *11*, 1855); 5-hydroxy-3,6,7,3′,4′-pentamethoxyflavone, 5,3′,4′-trihydroxy-3,6,7-trimethoxyflavone and an unidentified flavone isolated from leaves (*Planta Med.* 1977, *31*, 235).

B. lanceolaria (Roxb.) Druce var. *lanceolaria* syn. *B. myriocephala* DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 38).

Plant has been used as a carminative, obstipantia and antiberiberi agent in China; α-spinasterol isolated from stem and root (*Kue Li Tai-wan Tah Hsueh I Hsueh Yuan Yen Chiu Pao Kao* 1972, *17*, 42; *Chem. Abstr.* 1973, *78*, 69220 z).

B. myriocephala DC.; see *B. lanceolaria* (Roxb.) Druce var. *lanceolaria*

B. subcapitata DC.; see *B. lacera* (Burm.f.) DC.

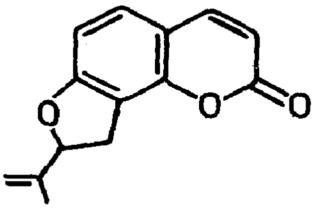
BOENNINGHAUSENIA (Rutaceae)

B. albiflora (Hook.) Reichb. ex Meissn. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 60).

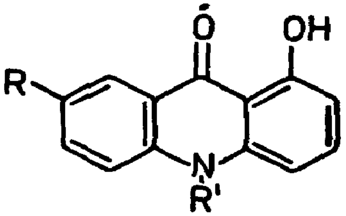
α-Phellandrene, terpinen-4-ol, α-terpinene, ocimene, α-caryophyllene, zingiberine, cadinene and β-ionone isolated from essential oil (*Indian Oil Soap J.* 1970, *35*, 207; *Chem. Abstr.* 1970, *73*, 133928 n); a new coumarin - 3-(1,1-dimethylallyl)xanthyletin (I) - isolated from aerial parts (*Phytochemistry* 1973, *12*, 2073); a new coumarin - nodakenetin acetate - along with xanthyletin, bergapten, isopimpinellin, xanthotoxin, daphnetin 8-methyl ether isolated from leaves and stems (*Phytochemistry* 1973, *12*, 2312); isolation and structure of angenomalin,

mp. 107° and micropubescin, mp. 118° (*Phytochemistry* 1973, *12*, 3010); two new E- and Z-coumarin isomers (II and III) isolated from leaves and characterised (*Phytochemistry* 1977, *16*, 291); isolation and structure of alkaloids - rutacridone, noracronycine, 1-hydroxyacridone and 1,7-dihydroxy-N-methylacridone (*Phytochemistry* 1978, *17*, 169).

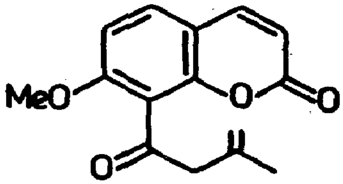
NEW COMPOUNDS



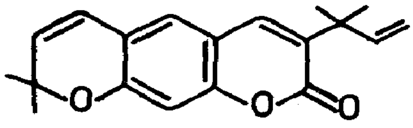
Angenomalin



1-Hydroxyacridone
R,R' = H
1,7-Dihydroxy-N-methylacridone
R = OH,R' = Me



Micropubescin



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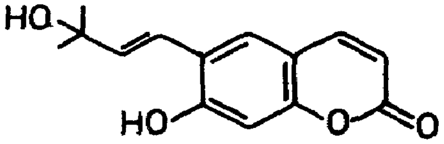

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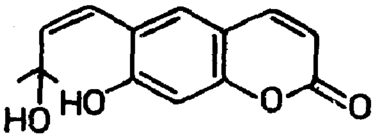

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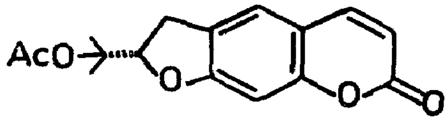


Nodakenetin acetate

BOERHAVIA (Nyctaginaceae)

B. diffusa L. syn. *B. repens* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 60).

Hentriacontane, β-sitosterol and ursolic acid isolated from roots (*Phytochemistry* 1971, *10*, 3318); a polysaccharide isolated which on hydrolysis yielded glucose, xylose, glucuronic acid, galactose, L-arabinose and L-rhamnose (*Bangladesh J. Sci. Ind. Res.* 1975, *10*, 84; *Chem. Abstr.* 1975, *83*, 190364 f); a glycoprotein with a molecular weight of 16,000-20,000 daltons isolated from roots (*Can. J. Bot.* 1979, *57*, 1214; *Chem. Abstr.* 1979, *91*, 87349 w).

BIOLOGICAL ACTIVITY

Glycoprotein was active against spherical and tubular viruses in hypersensitive and systemic hosts and was found responsible for inducing systemic resistance in plants (*Can. J. Bot.* 1979, *57*, 1214; *Chem. Abstr* 1979, *91*, 87349 w).

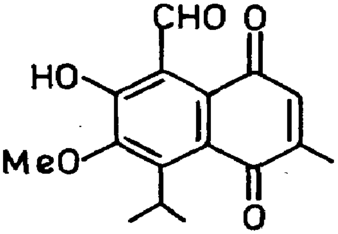
B. repens L.; see *B. diffusa* L.

BOMBAX (Bombacaceae)

B. ceiba L. syn. *Salmalia malabarica* Schott & Endl., *Bombax malabaricum* DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 61).

Lupeol, β-sitosterol, a naphthoquinone, mp. 87° (I) and potassium nitrate isolated from root bark and stem bark (*Curr. Sci.* 1971, *40*, 630; *J. Indian Chem. Soc.* 1971, *48*, 769; *Pei I Hsueh Pao* 1973, 126; *Chem. Abstr.* 1974, *81*, 60845 m); a highly branched polysaccharide isolated from flowers; it had a continuous backbone of 4(1→4)-β-linked D-galactopyranose and 2 (1→3)-β-linked L-arabinopyranose units with β-linked D-galactose and α-linked L-rhamnose and L-arabinose units as end group (*Planta Med.* 1972, *21*, 293); isolation and structure elucidation of anthocyanin A and anthocyanin B from flowers (*Planta Med.* 1973, *24*, 196); a naphthol (II), mp. 144° isolated (*Indian J. Chem.* 1973, *11*, 825); three new biosides isolated from flowers characterised as 24β-ethylcholest-5-en-3β-O-α-L-arabinopyranosyl(1→6)-β-D-glucopyranoside (III), 3,5-dihydroxy-4'-methoxyflavone-7-O–α-L-rhamnopyranosyl-(1→6)-β-D-glucopyranoside (IV) and 4',5,7- trihydroxyflavone-3-O-β-D-glucopyranosyl(1→4)-α-L-rhamnopyranoside (V) (*Arzneim. Forsch.* 1974, *24*, 285); a new lactone (VI) isolated from root bark and characterised (*Indian J. Chem.* 1976, *14*B, 616); n-hexacosanol and palmitic acid isolated from seeds (*Planta Med.* 1976, *29*, 148).

NEW COMPOUNDS



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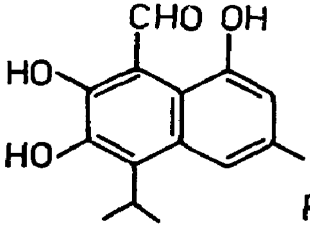

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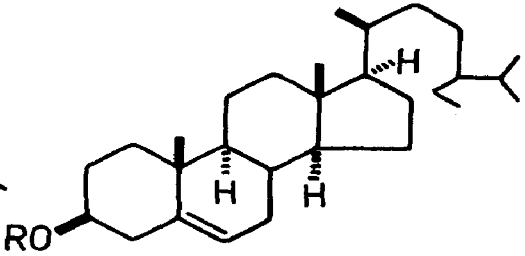
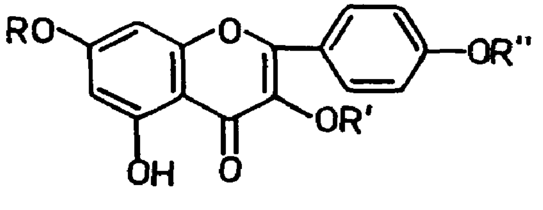
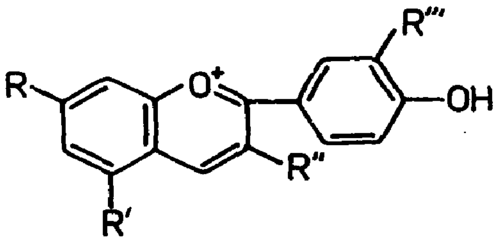


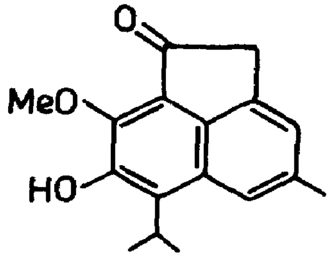
III
R = Glu(6→1)Ara



IV
R = Glu(6→1)Rha, R' = H,
R'' = Me
V
R,R'' = H,
R' = Rha(4→1)Glu



Anthocyanin A
R,R'' = OH, R' = O-Glu,
R''' = H
Anthocyanin B
R = OMe, R',R''' = OH,
R'' = O-Glu



VI

B. malabaricum DC.; see *B. ceiba* L.

BORRERIA (Rubiaceae)

B. articularis (L.f.) F. N. Will. syn. *B. hispida* (L.) K. Schum. (non Spruce ex K. Schum.), *Spermacoce hispida* L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 39).

Isorhamnetin isolated from seeds (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 131).

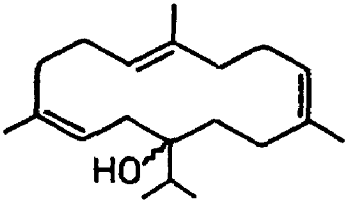
B. hispida (L.) K. Schum.; see *B. articularis* (L.f.) F. N. Will.

BOSWELLIA (Burseraceae)

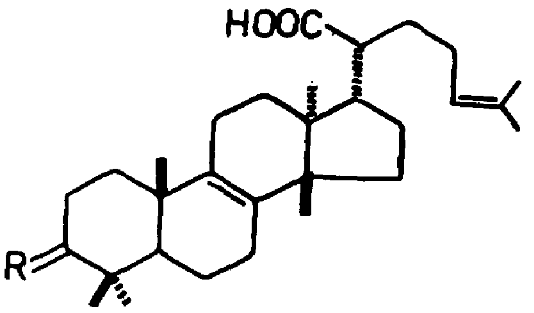
B. serrata Roxb. ex Coleb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 61).

3α-Hydroxytirucall-8,24-dien-21-oic acid (I), its acetyl derivative (II), 3-ketotirucall-8,24-dien-21-oic acid (III) and 3β-hydroxytirucall-8,24-dien-21-oic acid (IV) isolated from resin (*Indian J. Chem.* 1978, *16*B, 174); a new diterpene alcohol - serratol - isolated from gum resin and characterised (*Indian J. Chem.* 1978, *16*B, 171); isolation and structure of β-boswellic acid, its acetyl derivative (V), 11-keto-β-boswellic acid (VI) and its acetyl derivative (VII) from resin (*Indian J. Chem.* 1978, *16*B, 176); detection of p-cymene, d-limonene, terpinolene, bornyl acetate, α-pinene, α-thujene, α-phellandrene, methyl chavicol, α-terpineol in essential oil of leaves by TLC and GLC (*Indian Drugs* 1979, *16*, 80).

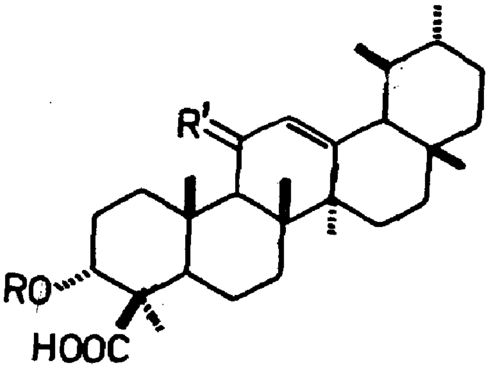
NEW COMPOUDNS



Serratol



I
R = α-OH,H
II
R = α-OAc,H
III
R = O
IV
R = β-OH,H



β-Boswellic acid
R = H, R' = H,H
V
R = Ac, R' = H,H
VI
R = H, R' = O
VII
R = Ac, R' = O

BRASSAIA (Araliaceae)

B. capitata (W. & A.) Clarke; see *Schefflera capitata* (W. & A.) Harms

BRASSICA (Brassicaceae)

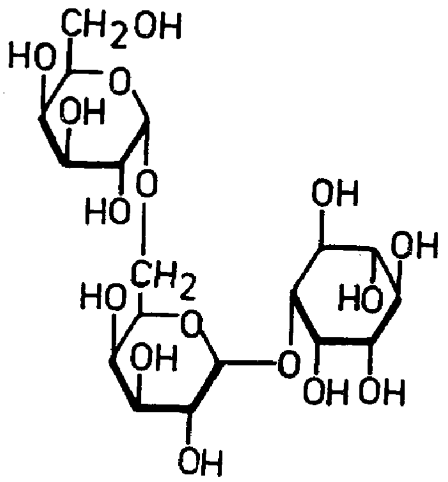
B. alba (L.) Rabenh.; see *Sinapsis alba* L.

B. campestris L. var. *rapa* (L.) Hartm.; see *B. rapa* L.

B. campestris L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 62).

An acidic arabinogalactan isolated from rape-seed is comprised of L-arabinose, D-galactose and D-glucuronic acid (*Carbohyd. Res.* 1972, *24*, 1; *Chem. Abstr.* 1972, *77*, 126957 a); α-D-galactopyranosyl-(1→6)-O-α-D-galactopyranosyl-(1→1)-L-myo-inositol (I) isolated from rape-seeds (*Carbohyd. Res.* 1973, *29*, 255; *Chem. Abstr.* 1973, *79*, 123710 v); structural studies on an arabinan isolated from rape-seed revealed a highly branched structure (*Carbohyd. Res.* 1974, *36*, 35; *Chem. Abstr.* 1974, *81*, 166393 c).

NEW COMPOUNDS



I

B. juncea (L.) Czern. & Coss. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 40).

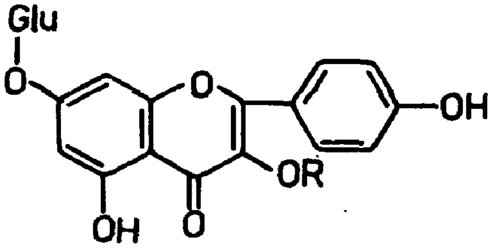
Detection of methyl, isopropyl, allyl, sec-butyl, 3-butenyl, 4-pentenyl, phenyl, 3-methylthiopropyl, benzyl and β-phenylethyl isothiocyanates in hydrolysate of plant extract by GC and mass spectrometry (*Yakugaku Zasshi* 1973, *93*, 453; *Chem. Abstr.* 1973, *79*, 89460 b); sinigrin, gluconapin, sinapine base and a volatile isothiocyanate (0.86%) from Egyptian mustard seeds (*Egypt. J. Pharm. Sci.* 1977, *16*, 113; *Chem. Abstr.* 1977, *87*, 19042 h).

B. campestris L. ssp. *napus* (L.) Hook.f. & Thoms.; see *B. napus* L.

B. napus L. syn. *B. campestris* L. ssp. *napus* (L.) Hook.f. & Thoms. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 62).

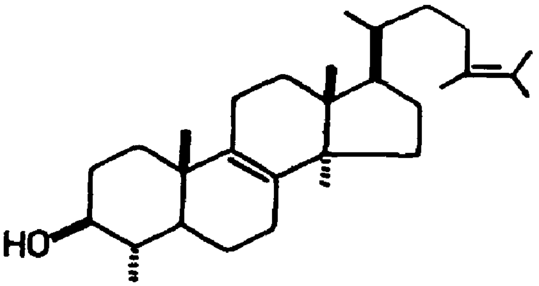
Detection of pteroylglutamate derivatives in seedlings by differential microbial assay (*Planta, Berlin* 1973, *114*, 95; *Chem. Abstr.* 1974, *80*, 12484 a); a new flavonoid - kaempferol-3-(O-sinapylsophoroside)-7-glucoside (I) - along with kaempferol-3—sophorosido-7-glucoside isolated (*Z. Naturforsch.* 1976, *31*, 622; *Chem. Abstr.* 1976, *85*, 156552 x); 24-methylene-lanost-8-en-3β-ol from seed oil (*Phytochemistry* 1976, *15*, 1781); two new 4α-methylsterols - 4α,14α,24-trimethyl-5-α-cholest-8,24-dien-3β-ol (II) and 4α,14α,24-trimethyl-9β,19-cyclocholest-24-en-3β-ol (III) - isolated from seeds (*Phytochemistry* 1977, *16*, 1448); nine triterpene alcohols, sixteen 4α-methylsterols and ten 4-demethylsterols identified in unsaponifiable fraction of seed oil (*Fette Seifen Anstrichm.* 1978, *80*, 382; *Chem. Abstr.* 1979, *90*, 164703 r); glucosyl fatty acid esters - 6-D-glucopyranosyl linolenate, palmitate, linoleate and oleate - isolated from pollen (*Phytochemistry* 1978, *17*, 1187).

NEW COMPOUNDS



I

R = Sinapylsophorose



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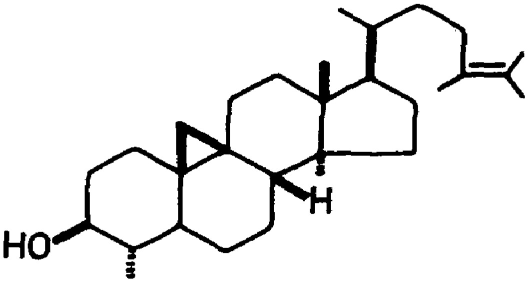


III

BIOLOGICAL ACTIVITY

6-D-glucopyranosyl linolenate, palmitate, linoleate and oleate used as plant growth promoters (*Phytochemistry* 1978, *17*, 1187).

B. nigra (L.) Koch. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 41).

Sinigrin, sinapine base and a volatile isothiocyanate (0.78%) from Egyptian mustard seeds (*Egypt. J. Pharm. Sci.* 1977, *16*, 133; *Chem. Abstr.* 1977, *87*, 19042 h).

B. oleracea L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 41).

3-Sophoroside-7-glucosides of kaempferol, quercetin and isorhamnetin isolated from leaves (*Phytochemistry* 1973, *12*, 1085); cyanidin-3-sophoroside-5-glucoside, cyanidin-3-malonylsophoroside-5-glucoside, cyanidin-3-p-coumarylsophoroside-5-glucoside, cyanidin-3-(di-p-coumaryl)-sophoroside-5-glucoside, cyanidin-3-ferulylsophoroside-5-glucoside, cyanidin-3-(diferulyl)sophoroside-5-glucoside, cyanidin-3-sinapylsophoroside-5-glucoside and cyanidin-3-(disinapyl)-sophoroside-5-glucoside isolated (*Phytochemistry* 1977, *16*, 297).

B. rapa L. syn. *B. campestris* L. var. *rapa* (L.) Hartm. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 40).

BIOLOGICAL ACTIVITY

S-Methyl-L-cysteine sulfoxide decreased blood cholesterol elevation induced in rats by a high cholesterol diet, but had no effect on phospholipid levels (*Experientia* 1972, *28*, 254).

BREYNIA (Euphorbiaceae)

B. rhamnoides (Willd.) Muell.-Arg.; see *B. vitis-idaea* (Burm.f.) Fischer

B. vitis-idaea (Burm.f.) Fischer syn. *B. rhamnoides* (Willd.) Muell.-Arg. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 41).

Detection of triacontane, ceryl alcohol, lanosterol, cholesterol, pentatriacontanoic and triacontanoic acids in leaves by GC (*J. Indian Chem. Soc.* 1978, *55*, 964).

BRIDELIA (Euphorbiaceae)

B. montana Willd. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 41)

β-Sitosterol, its β-D-glucoside and hexacosanol isolated from leaves (*Quart. J. Crude Drug Res.* 1975, *13*, 127; *Chem. Abstr.* 1976, *85*, 17114 t).

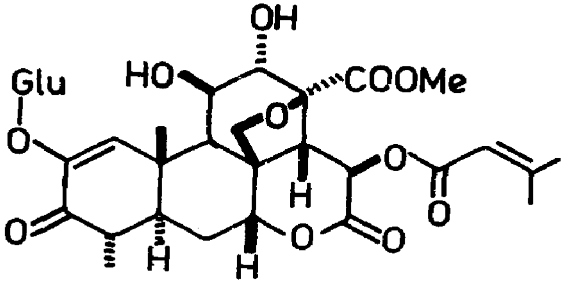
BRUCEA (Simaroubaceae)

B. amarissima (Lour.) Merr.; see *B. javanica* (L.) Merr.

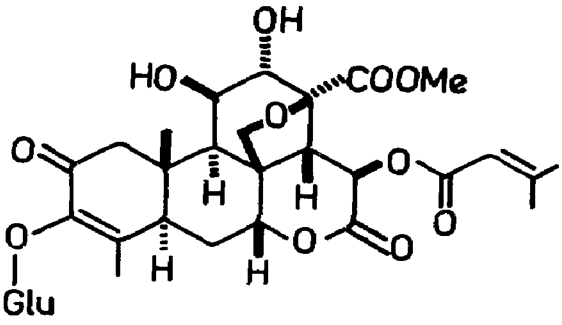
B. javanica (L.) Merr. syn. *B. amarissima* (Lour.) Merr., *B. sumatrana* Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 62).

A new bitter principle - bruceine Q - isolated (*Proc. Nat. Sci. Counc.* 1975, *8*, 139; *Chem. Abstr.* 1977, *86*, 34173 z); a phytotoxic protein - brutoxin - isolated from seeds (*Tai-wan Yao Hsueh Tsa Chih* 1977, *29*, 106; *Chem. Abstr.* 1979, *90*, 183160 c); two new antileukaemic quassinoid glycosides - bruceosides A and B - along with bruceines D and E isolated from seeds and their structures and stereochemistry established (*Chem. Commun.* 1977, *69*; *J. Org. Chem.* 1979, *44*, 2180).

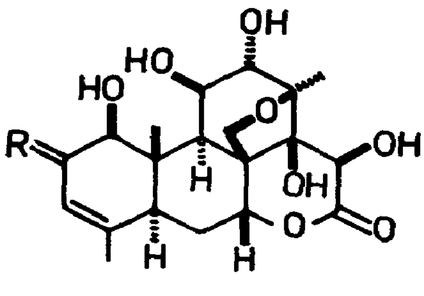
NEW COMPOUNDS



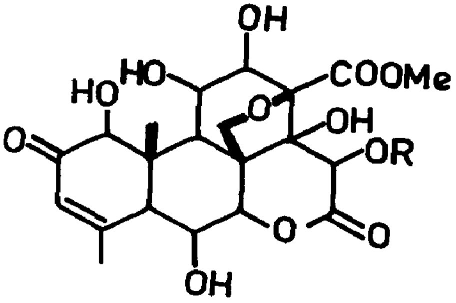
Bruceoside A



Bruceoside B



Bruceine D
R = O
Bruceine E
R = α-OH,H



Bruceine Q
R = CO(CHOH)$_4$CHMeCH$_2$OH

BIOLOGICAL ACTIVITY

LD50 of brutoxin in mice 2.05 mg/kg (*Tai-wan Yao Hsueh Tsa Chih* 1977, *29*, 106; *Chem. Abstr.* 1979, *90*, 183160 c).

B. sumatrana Roxb.; see *B. javanica* (L.) Merr.

BRUGUIERA (Rhizophoraceae)

B. eriopetala W. & A.; see *B. sexangula* (Lour.) Poir.

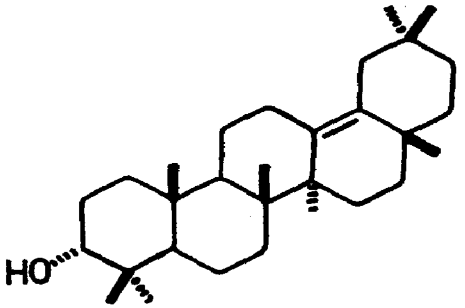
B. gymnorhiza (L.) Lamk.

Beng. - Kankra; Tel. - Thuddaponna; Tam. - Sigapukokandam.

β-Amyrone, triacontanol, taraxerol, β-amyrin and β-sitosterol isolated (*J. Indian Chem. Soc.* 1976, *53*, 1241); a new triterpene alcohol - gymnorhizol - together with sitosterol isolated and structure of former determined (*Indian J. Chem.* 1978, *16*B, 742).

Distribution : Tidal forests of India & Andamans.

NEW COMPOUNDS



Gymnorhizol

B. sexangula (Lour.) Poir. syn. *B. eriopetala* W. & A.

β-Amyrone, triacontanol, taraxerol, β-amyrin and β-sitosterol isolated (*J. Indian Chem. Soc.* 1976, *53*, 1241).

Distribution : Coastal regions of Kerala.

BRUNFELSIA (Solanaceae)

B. hopeana Benth. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 63).

Isolation and characterisation of hopeanine (*Diss. Abstr. Int.* B 1978, *39*, 761; *Chem. Abstr.* 1978, *89*, 191130 n).

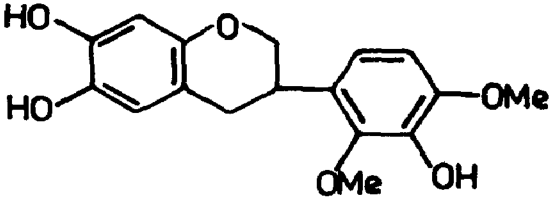
BRYA (Papilionaceae)

B. ebenus DC.

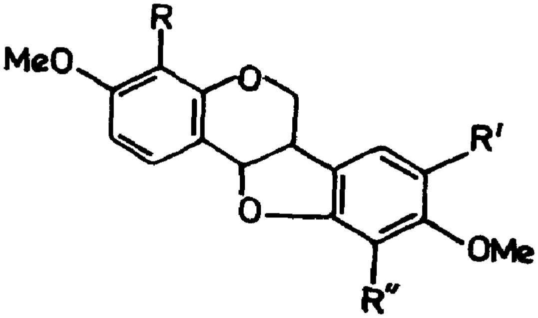
Isolation and structures of new pterocarpenes - bryacarpenes 1-5 - and bryaflavan (*J. Chem. Soc.* Perkin 1, 1974, 2429).

Distribution : Planted in Indian Botanic Garden, Howrah.

NEW COMPOUNDS



Bryaflavan



Bryacarpene 1
R,R'' = OH, R' = OMe
Bryacarpene 2
R = H, R' = OMe, R'' = OH
Bryacarpene 3
R = H, R',R'' = OMe
Bryacarpene 4
R = OH, R' = H, R'' = OMe
Bryacarpene 5
R,R' = H, R'' = OMe

BRYONIA (Cucurbitaceae)

B. dioca Jacq.

Eng. - White or red bryony.

25,26-Dihydro and 16,17,25,26-tetrahydroelasterol along with three unidentified compounds were isolated (*An. Quim.* 1969, *65*, 1139; *Chem. Abstr.* 1970, *73*, 73798 h).

Distribution : Punjab, Uttar Pradesh and Maharashtra.

BRYOPHYLLUM (Crassulaceae)

B. calycinum Salisb.; see *B. pinnatum* (Lam.) Oken

B. pinnatum (Lam.) Oken syn. *Kalanchoe pinnata* Pers., *Bryophyllum calycinum* Salisb. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 63).

Quercetin-3-L-rhamnosido-L-arabinofuranoside isolated (*Khim. Prir. Soedin.* 1969, *5*, 597; *Chem. Abstr.* 1970, *73*, 84621 w); quercetin-3-diarabinoside, mp. 190° and kaempferol-3-glucoside isolated (*Planta Med.* 1971, *20*, 368); alkanes C_{25}-C_{35} (n-hentriacontane, n-triacontane predominating), alkanols C_{26}-C_{34}, α-amyrin, β-amyrin and sitosterol isolated from nonsaponifiable fraction (*Phytochemistry* 1972, *11*, 1500); p-coumaric, ferulic, syringic, caffeic and p-hydroxybenzoic acids, quercetin and kaempferol detected in leaves (*Planta Med.* 1973, *23*, 149); wax hydrocarbons (C_{25-35}), wax alcohols (C_{26-36}) and fatty acids obtained from wax of leaves (*Planta Med.* 1974, *25*, 193).

BUDDLEJA (Buddlejaceae)

B. asiatica Lour. see *B. neemda* Ham. ex Roxb.

B. globosa Hope

4'-Methoxyapigenin, 6-hydroxyapigenin, p-hydroxybenzoic, vanillic, melilotic and syringic acids isolated (*Curr. Sci.* 1979, *48*, 383); acacetin-7-O-rutinoside, apigenin-7-O-glucoside, quercetin-3-O-rutinoside, scutellarein-7-O-glucoside isolated from flowers; luteolin-7-O-glucoside and 6-hydroxyluteolin-7-O-glucoside isolated from leaves (*Rev. Latinoam. Quim.* 1979, *10*, 19; *Chem. Abstr.* 1979, *91*, 16677 r).

Distribution : Introduced into India, grown in gardens.

B. madagascariensis Lam.

Apigenin, 6-hydroxyapigenin, salicylic, vanillic, syringic, protocatechuic and sinapic acids isolated (*Curr. Sci.* 1979, *48*, 383).

Distribution : Introduced into India, grown in gardens and runs wild at Mt. Abu and elsewhere in hills.

B. neemda Ham. ex Roxb. syn. *B. asiatica* Lour. (*Compend. Indian Med. Plants,* Vol, 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 64).

Apigenin, luteolin, 6-methoxyluteolin, melilotic acid, syringic acid, aucubin and asperuloside isolated (*Curr. Sci.* 1979, *48*, 383).

BUNIUM (Apiaceae)

B. persicum (Boiss.) Fedt. syn. *Carum bulbocastanum* auct. (non Koch.) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 53).

Detection of α-pinene, β-pinene, car-3-ene, limonene, γ-terpinene, p-cymene, cuminaldehyde, p-mentha-1,4-dien-7-al, p-mentha-1,3-dien-7-al, linalool, cuminyl alcohol, myristicin, carvacrol and β-phellandrene in essential oil of seeds by GLC (*Pakistan J. Sci. Ind. Res.* 1977,

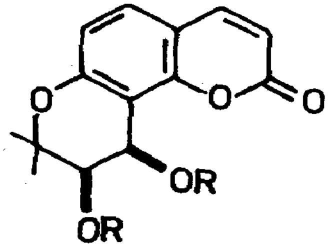
20, 106; *Chem. Abstr.* 1979, *90*, 138033 c); fruits contained essential oil (2.5%) which comprised of p-cymol (19.15), cuminaldehyde (40.66%), α- and β-pinene, limonene, camphor and acetic, propionic, butyric, oleic and benzoic acids (*Dokl. Akad. Nauk. Tadzh. SSR* 1978, *21*, 33; *Chem. Abstr.* 1978, *89*, 143369 a).

BUPLEURUM (Apiaceae)

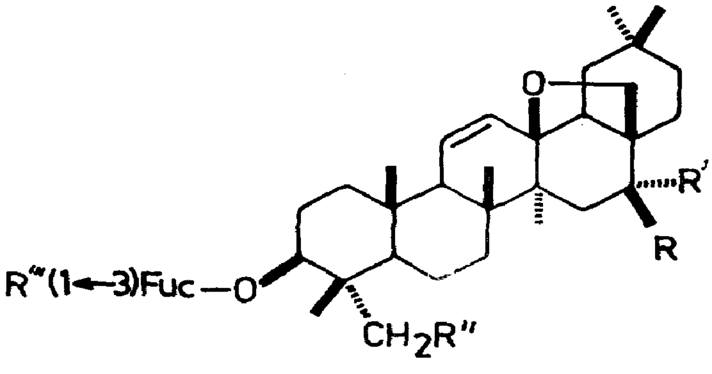
B. falcatum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 64).

Nonacosan-10-one, α-spinasterol and β-sitosterol isolated from leafy stems (*Shoyakugaku Zasshi* 1972, *26*, 64; *Chem. Abstr.* 1973, *78*, 1991 w); isolation of saikosaponin a, saikosaponin c and saikosaponin d by methanolic alkali (2.0%) treatment of plant root (*Shoyakugaku Zasshi* 1975, *29*, 99; *Chem. Abstr.* 1976, *85*, 10342 g); pentadeca-2,9-dien-4,6-diyn-1-yl acetate isolated (*Yakhak Hoe Chi* 1975, *19*, 16; *Chem. Abstr.* 1976, *84*, 71409 k); crude saikosaponin b fraction separated by TLC into saikosaponin b_2, mp. 255° and saikosaponin b_4, mp. 245°; similarly crude saikosaponin a fraction was shown to be a mixture of saikosaponins a and b_3 in the ratio of 9:1 along with a small amount of saikosaponin b_1. Both saikosaponins a and b_1 ran concurrently on TLC; these saikosaponins b_1,b_2,b_3 and b_4 shown to be artefacts derived from saikosaponins a and d, arising from action of acid substance in plant upon extraction with methanol (*J. Chem. Soc.* Perkin 1, 1975, 2043; *Planta Med.* 1978, *34*, 287); a new saikosaponin f isolated and physico-chemical studies on saikosaponins a,c,d and f (*Tetrahedron Lett.* 1976, 4163, 4167); (-)anomalin, mp. 173°, isolated and identified (*Indian J. Chem.* 1977, *15*B, 293); structures of saikosaponin e and five minor acetylsaikosaponins (I to V) determined (*Tetrahedron Lett.* 1977, 1227, 1231).

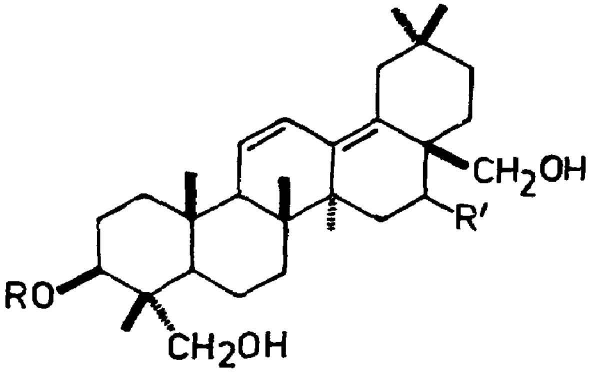
NEW COMPOUNDS



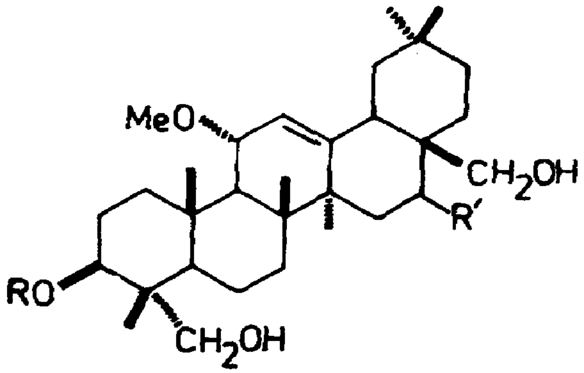
Anomalin
R = Tigloyl



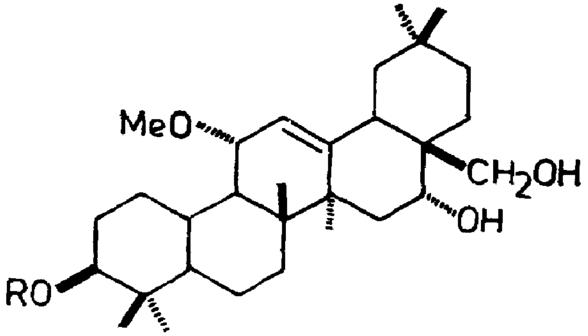
	R	R′	R′′	R′′′
I	H	OH	OH	Glu(3′-OAc)
II	H	OH	OH	Glu(6′-OAc)
III	OH	H	OH	Glu(6′-OAc)
IV	OH	H	OAc	Glu
Saikosaponin e	OH	H	H	Glu



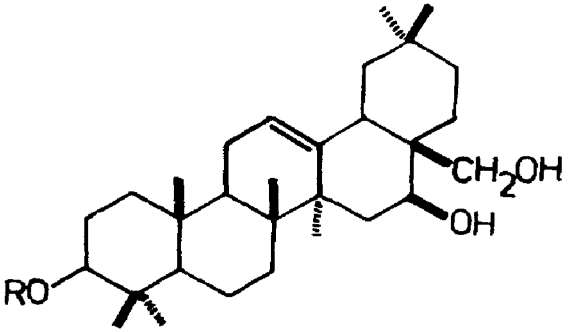
Saikosaponin b1
R = Fuc(3→1)Glu, R' = β-OH
Saikosaponin b2
R = Fuc(3→1)Glu, R' = α-OH



Saikosaponin b3
R = Fuc(3→1)Glu, R' = β-OH
Saikosaponin b4
R = Fuc(3→1)Glu, R' = α-OH



V
R = Fuc(3→1)Glu(6'-OAc)



Saikosaponin f
R = Rha-Glu-Glu

BIOLOGICAL ACTIVITY

Saikosapogenin A administered i.p. counteracted excitatory motor activity of methamphetamine in mice. It also had antipyretic, antitussive and hypothermic effects and inhibited writhing response to acetic acid. It had marked therapeutic effect on oedema induced by carrageenin in rats. Oral administration of crude saikosides mixture (2 g/kg) showed analgesic activity (*Yakugaku Zasshi* 1973, *93*, 1660; *Chem. Abstr.* 1974, *80*, 116158 p); crude saikosides given intraduodenally to pylorus-ligated rats reduced stomach pepsin activity. Saikosides normalised liver function at 500 mg/kg/day for 3 days (*Shoyakugaku Zasshi* 1976, *30*, 62; *Chem. Abstr.* 1977, *87*, 62641 q); mechanism of action of saikosaponins on membranes investigated; saikosaponins a and b1, caused a more marked decrease in membrane fluidity saikosaponins d and b2 as shown by changes in ESR spectra using spin-labelled erythrocytes. Results did not reveal any close relationship between haemolytic activity of saikosaponins and membrane fluidity (*Planta Med.* 1978, *34*, 287).

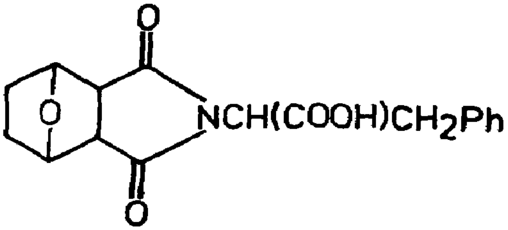
BUTEA (Papilionaceae)

B. frondosa Koen. ex Roxb.; see *B. monosperma* (Lam.) Taub.

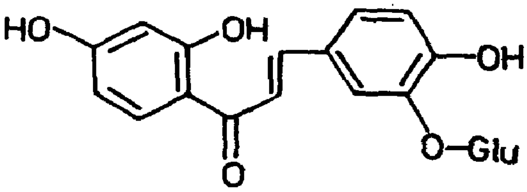
B. monosperma (Lam.) Taub. syn. *B. frondosa* Koen. ex Roxb. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 66).

A nitrogenous acidic compound (I) along with palasonin isolated from seeds (*Chem. Ind.* 1970, 1376); two new glucosides - monospermoside and isomonospermoside - isolated together with butrin, isobutrin, coreopsin, isocoreopsin and sulfurein and structures of monospermoside and isomonospermoside determined (*Phytochemistry* 1970, *9*, 2231); isolation and structures of jalaric esters I, II and laccijalaric esters III, IV from soft resin (*Tetrahedron* 1974, *30*, 867); α-amyrin, β-sitosterol, its glucoside and sucrose isolated from seeds (*Indian J. Pharm.* 1977, *39*, 79); modified method for isolation of anthelmintic principle - palasonin (*Indian J. Pharm. Sci.* 1978, *40*, 97); isolation and structure of a new lactone - n-heneicosanoic acid-δ-lactone (II) mp. 70°, from seeds (*Planta Med.* 1979, *35*, 286); glycerides of palmitic, stearic, lignoceric, oleic and linoleic acids from seed oil (*Fette Seifen Anstrichm.* 1971, *73*, 437; *Chem. Abstr.* 1971, *75*, 106095 y).

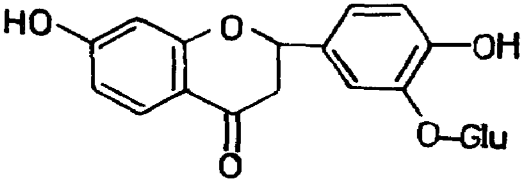
NEW COMPOUNDS



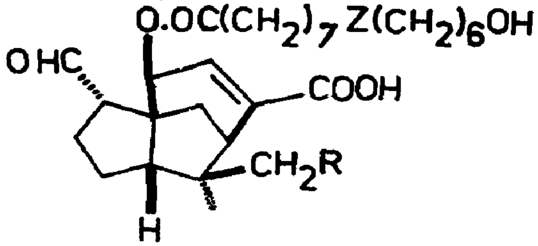
I



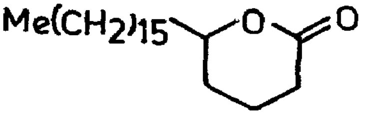
Monospermoside



Isomonospermoside



Jalaric ester I
R = OH, Z = CH=CH
Jalaric ester II
R = OH, Z = $(CHOH)_2$
Laccijalaric ester I
R = H, Z = CH=CH
Laccijalaric ester II
R = H, Z = $(CHOH)_2$



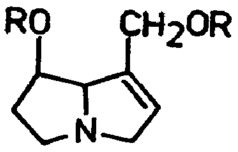
II

CACCINIA (Boraginaceae)

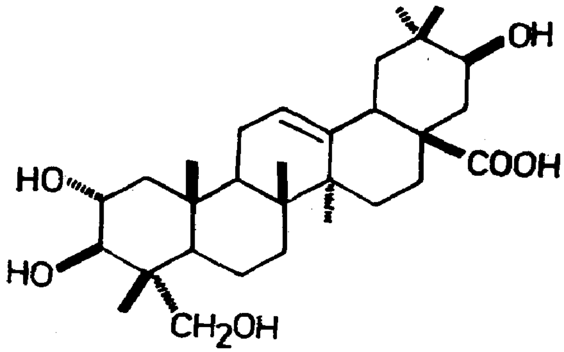
C. crassifolia O. Kuntze syn. *C. glauca* Savi (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 66).

Caccigenin, caccigenin lactone and 23-deoxycaccigenin isolated from leaves and stems; caccigenin characterised as $2\alpha,3\beta,21\beta,23$-tetrahydroxy-olean-12-en-28-oic acid *(Indian J. Chem.* 1970, *8,* 593); isolation and structure of a new pyrrolizidine alkaloid G-1 from flowers (*Phytochemistry* 1978, *17,* 2049).

NEW COMPOUDNS



Alkaloid G-I
R = Benzoyl



Caccigenin

C. glauca Savi; see *C. crassifolia* O. Kuntze

CADABA (Capparaceae)

C. farinosa Forsk.; see *C. fruticosa* (L.) Druce

C. fruticosa (L.) Druce syn. *C. farinosa* Forsk., *C. indica* Lamk. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 43).

Cadabine isolated from leaves and identified as stachydrine (*Pakistan J. Sci. Ind. Res.* 1971, *14,* 343; *Chem. Abstr.* 1972, *77,* 111459 r; *Phytochemistry* 1975, *14,* 292).

C. indica Lamk.; see *C. fruticosa* (L.) Druce

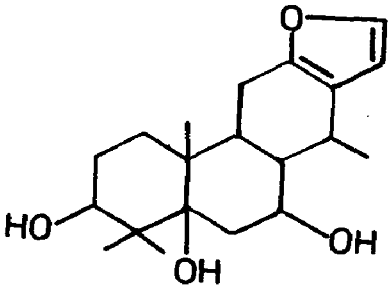
CAESALPINIA (Caesalpiniaceae)

C. pulcherrima (L.) Swartz syn. *Poinciana pulcherrima* L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 67).

A new diterpene - caesalpin - isolated from bark and its structure determined (*Chem. Ind.* 1970, 534); β-sitosterol, sebacic acid, quercimeritrin and leucodelphinidin isolated from stem bark and cyanin from flowers (*J. Indian Chem. Soc.* 1977, *54,* 646; *Indian J. Pharm.* 1978, *40,* 15); lupeol, sucrose, glucose, fructose, traces of xylose and three phenolic compounds isolated from flowers (*Indian J. Pharm.* 1978, *40,* 15); lupeol, gallic acid, quercetin and rutin isolated from red-flowered variety; lupeol acetate, gallic acid, quercetin and myricetin isolated from orange-yellow-flowered variety (*Indian J. Pharm. Sci.* 1978, *40,* 103); gallic acid, leucodelphinidin and tannin B obtained from one-year old plant, whereas young plant contained the

former two compounds and tannin C, a novel type of ellagitannin (*11th IUPAC Int. Symp. Chem. Nat. Prod.* 1978, *2*, 202; *Chem. Abstr.* 1979, *91*, 207421 n).

NEW COMPOUNDS



Caesalpin

C. sappan L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 44).

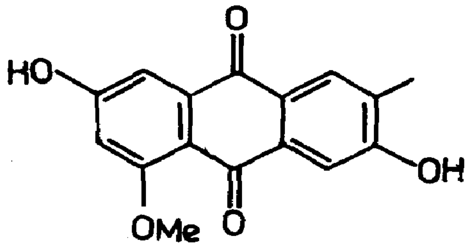
β-Amyrin glucoside, alanine, aspartic acid, glycine, proline, valine, leucine, threonine, norvaline, lactose, glucose, galactose, sorbose, 4-methylgalactose, 3,4-dimethylgalactose and 2-deoxyribose from heartwood (*Indian J. Pharm.* 1977, *39*, 85); palmitic (27.62), stearic (44.15), linoleic (25.94) and oleic acids (2.82%) in heartwood oil (*J. Inst. Chemists,* Calcutta 1978, *50*, 65; *Chem. Abstr.* 1978, *89*, 160155 v; *Acta Cienc. Indica* 1978, *4*, 120; *Chem. Abstr.* 1979, *90*, 51441 k).

CAJANUS (Papilionaceae)

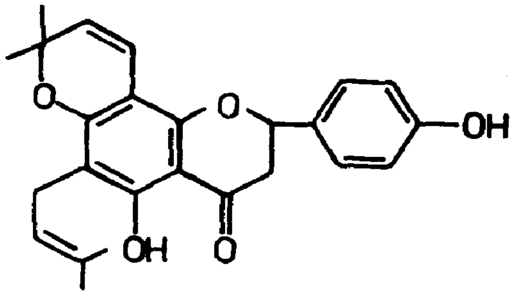
C. cajan (L.) Millsp. syn. *C. indicus* Spreng. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 44).

C_{26-37} alkanes (16.6), C_{36-62} esters (8.4), C_{20-34} alcohols (26.4), lupeol (19.2) and phytosterols (29.4%) which consisted of β-sitosterol (52.1), stigmasterol (39.3), campesterol (8.3) and cholesterol (0.3%) from leaves (*Collect. Czech. Chem. Commun.* 1977, *42*, 2448); isolation and structure of a new flavanone - cajaflavanone (*Phytochemistry* 1978, *17*, 2045); structure of major phytoalexin - cajanol - revised to 5,4'-dihydroxy-7,2'-dimethoxy-isoflavanone (*Z. Naturforsch.* 1979, *34* c, 159; *Chem. Abstr.* 1979, *90*, 164736 d); a new isoflavanone - 2'-O-methylcajanone - isolated and its structure established (*Phytochemistry* 1979, *18*, 693); isolation and structure of a new isoflavone glucoside - 5,2'-dihydroxyisoflavone-7-O-β-D-glucoside (I) - and isolation of sitosterol-β-D-glucoside, genistein, sitosterol, lupeol, α- and β-amyrins (*Phytochemistry* 1979, *18*, 365); a new anthraquinone - cajaquinone - isolated from roots and bark and its structure determined (*Indian J. Chem.* 1979, *17B*, 88).

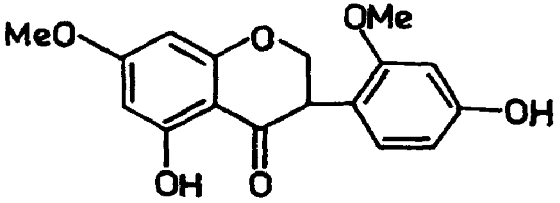
NEW COMPOUNDS



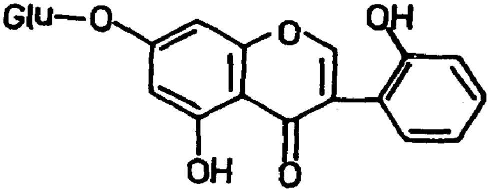
Cajaquinone



Cajaflavanone



Cajanol



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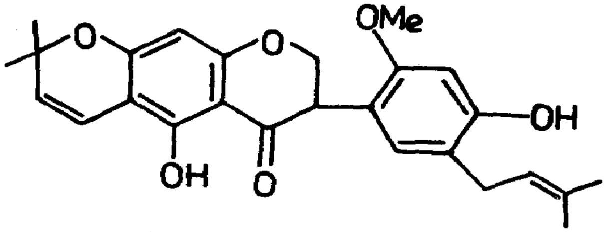

2'-O-Methylcajanone

CALENDULA (Asteraceae)

C. officinalis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 68).

Plant tincture 3-9° CH (Centesimal Hahnemann) dilution used for prevention and treatment of redness, oedema and pain associated with sunburn. Aqueous solution (4°CH) when administerd orally showed healing effect in UV light-induced erythema in guinea pigs (Ger. 2,720,420 (1977) Dec., 01; *Chem. Abstr.* 1978, *88*, 65996 r).

β-Sitosterol glucoside, stigmasterol glucoside and isofucosterol glucoside isolated from flowers (*Bull. Acad. Pol. Sci. Ser. Chim.* 1969, *17*, 397; *Chem. Abstr.* 1970, *72*, 32169 q); α-amyrin, taraxasterol, lupeol, ψ-taraxasterol as well as their esters obtained from flowers (*Bull. Acad. Pol. Sci. Ser. Chim.* 1969, *17*, 399; *Chem. Abstr.* 1970, *72*, 21802 q); structure of calenduloside A elucidated (*Khim. Prir. Soedin.* 1971, *7*, 22; *Chem. Abstr.* 1971, *74*, 112385 p); structure of calenduloside B established as β-D-galactopyranosyl(1→4)-β-D-glucopyranosyl(1→3)-oleanano-(28→1)-α-D-glucopyranoside (*Khim. Prir. Soedin.* 1971, *7*, 533;

Chem. Abstr. 1971, *75*, 152042 b); isorhamnetin-3-β D-glucopyranoside, quercetin-3β-D-glucopyranoside, a new flavanoid - isorhamnetin-3-β-D-glucopyranosyl(6→1)-β-L-rhamnofuranoside (I) - and three other flavonoids isolated (*Farm. Zh.* 1972, *27*, 44; *Chem. Abstr.* 1972, *77*, 45484 s); isolation and structure of calenduloside F from roots (*Khim. Prir. Soedin.* 1973, *9*, 561; *Chem. Abstr.* 1974, *80*, 15150 z); a new triterpene diol - ursadiol - isolated from flowers and characterised (*Phytochemistry* 1973, *12*, 157); isolation and structure of calenduloside E from roots (*Khim. Prir. Soedin.* 1973, *9*, 560; *Chem. Abstr.* 1974, *80*, 15151 a); structures of faradiol and arnidiol revised to 3β,16β-dihydroxy-ψ-taraxene and 3β,16β-dihydroxytaraxene respectively (*Tetrahedron Lett.* 1973, 809; *Rocz. Chem.* 1977, *51*, 2331; *Chem. Abstr.* 1978, *88*, 191151 z); a new triterpene triol - 3,16,21-trihydroxy-12-ursene (II) - isolated from flowers and characterised (*Phytochemistry* 1973, *12*, 2299).

Calendulosides G and H isolated and characterised as 3-O-β-D-galactopyranosyl(1→3)-β-glucuronopyranoside of oleanolic acid and 28-acyl-β-D-glucopyranoside of calenduloside G respectively (*Khim. Prir. Soedin.* 1974, *10*, 532; *Chem. Abstr.* 1975, *82*, 54182 x); cholestanol, campestanol, stigmastenol, cholest-7-en-3-ol, 24-methylcholest-7-en-3β-ol, stigmast-7-en-3β-ol, 24-methylcholest-5,22-dien-3β-ol, cholesterol, 24-methylenecholesterol, campesterol, sitosterol, stigmasterol and clerosterol from leaves and seedlings (*Phytochemistry* 1975, *14*, 627); structures of calendulosides C and D from roots elucidated (*Khim. Prir. Soedin.* 1975, *11*, 366; *Chem. Abstr.* 1976, *84*, 74566 v); structure of ursadiol revised to 3β,16β-dihydroxyolean-13(18)-ene and that of maniladiol to 3β,16β-dihydroxyolean-12-ene (*Rocz. Chem.* 1977, *51*, 2493; *Chem. Abstr.* 1978, *89*, 39364 j); structure of calenduladiol revised and its identity with beyeriadiol established (*Rocz. Chem.* 1977, *51*, 1141; *Chem. Abstr.* 1978, *88*, 23189 z); structure of citrostadienol established as 4α-methylstigmasta-7-(Z)24(28)-dien-3β-ol (*Rocz. Chem.* 1977, *51*, 951; *Chem. Abstr.* 1977, *87*, 180646 t); oleanolic acid was detected in plant (*Stud. Cercet. Biochim.* 1978, *21*, 89; *Chem. Abstr.* 1978, *89*, 176359 a); p-hydroxybenzoic, p-coumaric, gentisic, vanillic and caffeic acids found in flowers and receptacles; o-hydroxyphenylacetic, syringic and protocatechuic acids in receptacles only (*Herba Pol.* 1978, *24*, 187; *Chem. Abstr.* 1979, *91*, 52767 a);

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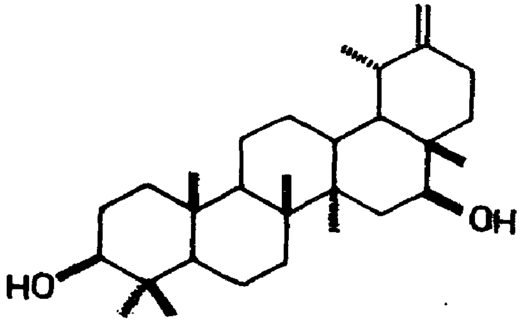
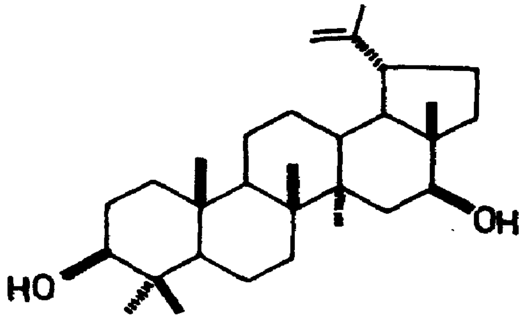
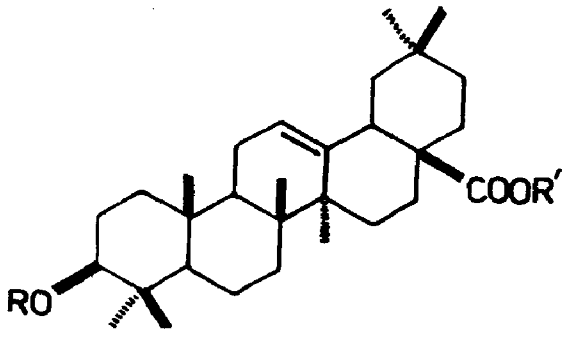
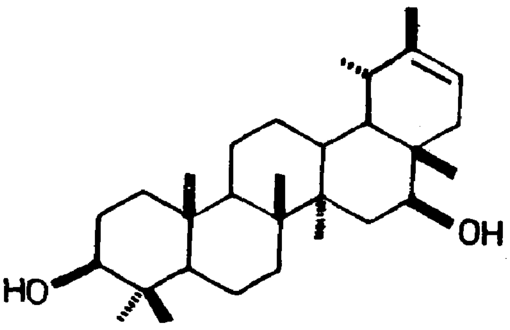


Arnidiol



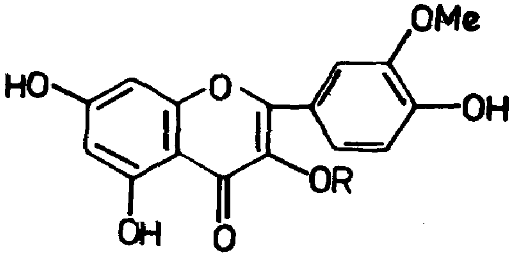
Calenduladiol



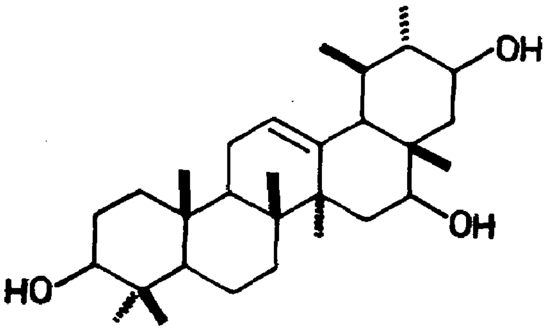


Faradiol

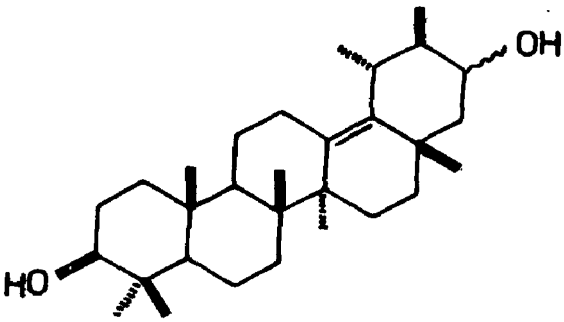
Calenduloside B
R = Glu(4→1)Gal, R' = Glu
Calenduloside C
R = Glu[(2→1)Glu](3→1)Gal, R' = H
Calenduloside D
R = Glu[(2→1)Glu](3→1)Gal, R' = Glu
Calenduloside E
R = Gluc.acid, R' = H
Calenduloside F
R = Gluc. acid, R' = Glu
Calenduloside G
R = Gluc. acid(3→1)Gal, R' = H



I
R = Glu(6→1)Rha



II



Ursadiol

BIOLOGICAL ACTIVITY

Calenduloside B showed antiulcer activity in three experimental ulcer models in rats. It also had antiinflammatory and neurotropic activities, but had no effect on cardiovascular system, tone of intestinal smooth muscle, renal and liver functions. Rats tolerated a daily dose of 200 mg/kg for 2 months without any adverse response (*Farmakol. Toksikol.* 1978, *41*, 556; *Chem. Abstr.* 1978, *89*, 209164 p).

CALLICARPA (Verbenaceae)

C. arborea Roxb. ex Clarke (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 45).

Maslinic, oleanolic and ursolic acids, lupeol acetate, β-amyrin acetate and β-sitosterol acetate isolated from leaves; β-sitosterol and oleanolic acid from heartwood (*Curr. Sci.* 1977, *46*, 667; *J. Indian Chem. Soc.* 1978, *55*, 744).

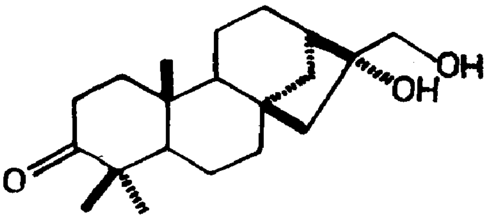
C. longifolia Lam. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 45).

Calliterpenone, its monoacetate and ursolic acid from leaves (*Phytochemistry* 1974, *13*, 306).

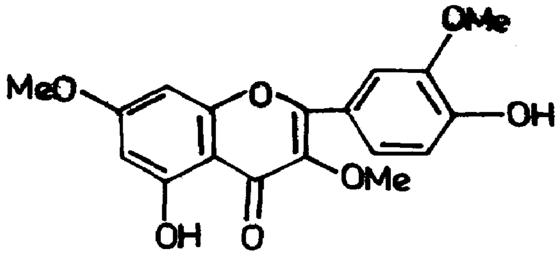
C. macrophylla Vahl (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 45).

A new tetracyclic diterpene - calliterpenone - and its acetate isolated and their stereostructures established (*Tetrahedron* 1972, *28*, 4319; *Tetrahedron Lett.* 1973, 2179; *Phytochemistry* 1974, *13*, 306; *J. Indian Chem. Soc.* 1976, *53*, 1165); structure of calliterpenone revised to 3-oxo-13β-kaurane-16α,17-diol (*Phytochemistry* 1975, *14*, 2249); luteolin, apigenin, luteolin-7-O-glucuronide and apigenin-7-O-glucuronide from leaves (*Phytochemistry* 1974, *13*, 306); isolation and identification of flavone CMF-1 as 3,3',7-trimethoxy-4',5-dihydroxyflavone, from leaves (*J. Indian Chem. Soc.* 1978, *55*, 628).

NEW COMPOUNDS



Calliterpenone



CMF-1

CALLISTEMON (Myrtaceae)

C. lanceolatus DC.

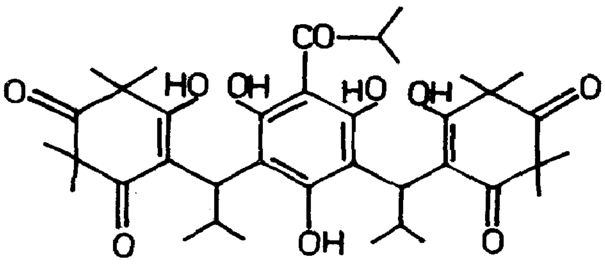
Eng. - Bottle brush.

Betulic acid and another triterpenic acid isolated from flowers (*Proc. Nat. Acad. Sci.* India 1972, *42A*, 86; *Chem. Abstr.* 1974, *80*, 45657 n); 3,3'-di-O-methylellagic acid, 3,3',4-tri-O-methylellagic acid and ellagic acid isolated from seed and bark (*Indian J. Chem.* 1972, *10*, 959); detection of sixteen saturated acids and linoleic acid (65.4%) in seed oil (*Indian J. Appl. Chem.* 1972, *35*, 35; *Chem. Abstr.* 1973, *79*, 96832 c); 1,8-epoxy-p-menthane (60%) isolated from leaf oil (*Riechst., Aromen, Koerperpflegem* 1972, *22*, 113; *Chem. Abstr.* 1972, *77*, 72527 q); sitosterol, erythrodiol, betulin, betulinic, ursolic and 2α-hydroxyursolic acids isolated from leaves; a new triterpene - 2α-hydroxyuvaol - was also isolated and characterised

(*Phytochemistry* 1975, *14*, 592, 1675); isolation of myrtucommulone A from leaves (*Phytochemistry* 1977, *16*, 1851).

Distribution : Grown as ornamental.

NEW COMPOUNDS



Myrtucommulone A

CALLISTEPHUS (Asteraceae)

C. chinensis (L.) Nees

Apigenin and its 7-O-glucoside(cosmosiin) isolated from inflorescence (*Khim. Prir. Soedin.* 1971, 7, 375; *Chem. Abstr.* 1971, 75, 115851 u).

Distribution : Native of China and Japan, grown in Indian gardens.

CALLITRIS (Cupressaceae)

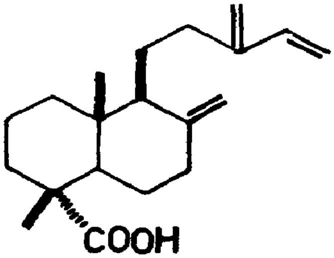
C. cupressiformis Vent. syn. *C. rhomboidea* R. Br.

Tam. - Candiracu.

4-Epi-isocommunic acid and amentoflavone isolated; structure of former established (*Phytochemistry* 1977, *16*, 801).

Distribution : Native of Australia, introduced into Nilgiris and elsewhere in Tamil Nadu.

NEW COMPOUNDS



4-Epiisocommunic acid

CALONYCTION (Convolvulaceae)

C. aculeatum (L.) House; see *Ipomoea alba* L.

C. muricatum (L.) G. Don; see *Ipomoea turbinata* Lag.

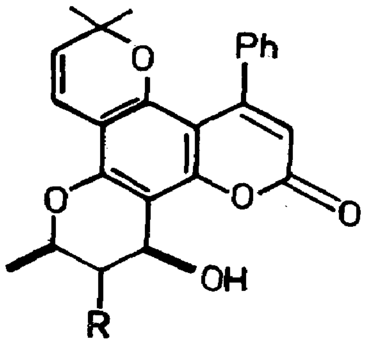
CALOPHYLLUM (Clusiaceae)

C. elatum **Bedd.**; see *C. polyanthum* Wall. ex Choisy

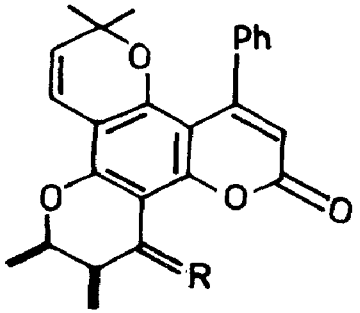
C. inophyllum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 69).

Myricetin, its 7-glucoside and quercetin isolated from flowers (*Phytochemistry* 1971, *10*, 1679); five piscicidal 2H,6H,10H- benzo[1,2-b:3,4-b:5,6-b'']-tripyran derivatives - inophyllum A,B,C,D and E - isolated from leaves; inophyllum C identified as (+)inophyllolide and E as its cis isomer (*Bull. Inst. Chem. Res.* Kyoto Univ. 1972, *50*, 160; *Chem. Abstr.* 1973, *78*, 13744 f); isolation and structure of a new 4-alkylcoumarin (I) (*C. R. Acad. Sci.* Ser. C 1972, 275, 1105; *Chem. Abstr.* 1973, *78*, 58264 r); five new coumarins (II to VI) isolated and characterised (*Tetrahedron Lett.* 1972, 3187); structure of calophynic acid established (*Tetrahedron Lett.* 1972, 2715); revised structure of ponnalide (*Indian J. Chem.* 1972, *10*, 255); structure of myricetin-7-glucoside confirmed (*Curr. Sci.* 1974, *43*, 476).

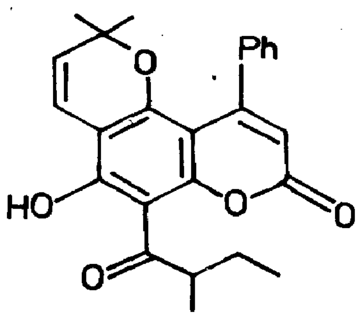
NEW COMPOUNDS



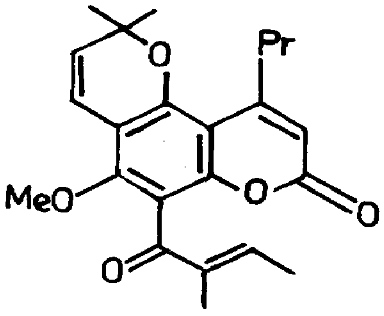
Inophyllum A
R = β-Me
Inophyllum B
R = α-Me



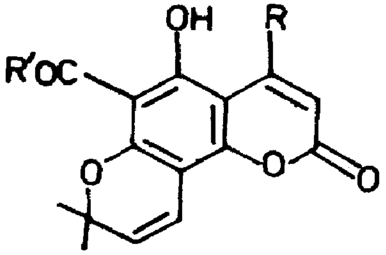
Inophyllum D
R = α-OH,H
Inophyllum E
R = O



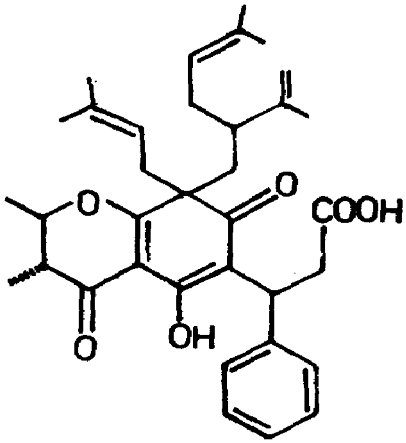
Ponnalide



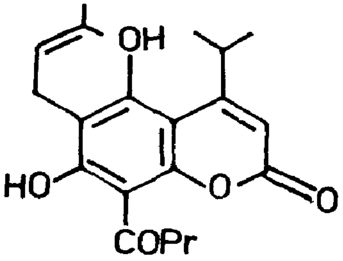
I



II
R,R' = Pr
III
R = Pr, R' = $CHMe_2$
IV
R = $(CH_2)_4Me$, R' = CH_2CHMe_2
V
R = $(CH_2)_4Me$, R' = CHMeEt



Calophynic acid



VI

BIOLOGICAL ACTIVITY

Calophyllolide showed anticonvulsant and anti-inflammatory activities in rodents (*Res. Commun. Chem. Pathol. Pharmacol.* 1974, *9*, 11; *Chem. Abstr.* 1975, *82*, 38600 b.)

C. polyanthum Wall. ex Choisy syn. *C. elatum* Bedd, *C. tomentosum* auct. (non Wight) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 70).

BIOLOGICAL ACTIVITY

Friedelan-3β-ol showed anticonvulsant and anti-inflammatory activities in rodents (*Res. Commun. Chem. Pathol. Pharmacol.* 1974, *9*, 11; *Chem. Abstr.* 1975, *82*, 38600 b).

C. tomentosum Wight; see *C. polyanthum* Wall. ex Choisy

CALOPOGONIUM (Papilionaceae)

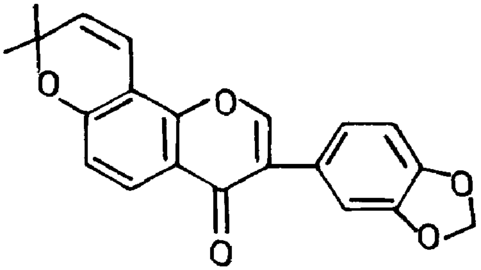
C. mucunoides Desv.

2',4',5',7-Tetramethoxyisoflavone,3',4',7'-trimethoxyisoflavone (cabreuvin), 7-methoxy-3',4'-methylenedioxyisoflavone, 4',5'-dihydroxy-6'',6''-dimethylpyrano(3'',2'':6,7) isoflavone and new 3',4'-methylenedioxy-6'', 6''-dimethylpyrano(2'',3'':7,8)isoflavone (calopogonium isoflavone B) isolated from seeds (*Bull. Soc. R. Sci. Liege* 1976, *45*, 468;

Chem. Abstr. 1977, *86*, 152677 q).

Distribution : American species introduced into India as cover crop in rubber and other plantations.

NEW COMPOUNDS



Calopogonium isoflavone B

CALOTROPIS (Asclepiadaceae)

C. procera (Ait.) R. Br. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 71).

Pharmacognostic study of leaf (*J. Res. Indian Med.* 1971, *6*, 167).

α-Amyrin, β-amyrin and β-sitosterol isolated from latex of Egyptian plant (*Bull. Fac. Pharm.* Cairo Univ. 1968, *7*, 91; *Chem. Abstr.* 1970, *73*, 63160 e); calotropin, calotoxin, uscharin and uscharidin isolated from latex (*Bull. Fac. Pharm.* Cairo Univ. 1971, *10*, 1; *Chem. Abstr.* 1973, *78*, 156644 j); cyanidin-3-rhamnoglucoside isolated from flowers (*Vijnana Parishad Anusandhan Patrika* 1978, *21*, 177; *Chem. Abstr.* 1979, *90*, 183171 g); β-amyrin isolated from leaves, stem, roots and latex (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 152).

BIOLOGICAL ACTIVITY

Calotropin showed digitalis-like action on the heart, but its action was not cumulative and was less harmful (*Bull. Fac. Pharm.* Cairo Univ. 1971, *10*, 1; *Chem. Abstr.* 1973, *78*, 156644 j).

CALTHA (Ranunculaceae)

C. palustris L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 47).

A stereoisomer of lutein - calthaxanthin - having chirality as 3R,3'S,6'R isolated (*Z. Pflanzenphysiol.* 1974, *72*, 177; *Chem. Abstr.* 1974, *81*, 87961 h); triterpenoid glycosides isolated (*Rastit. Resur.* 1978, *14*, 93; *Chem. Abstr.* 1978, *88*, 115364 f).

BIOLOGICAL ACTIVITY

Triterpenoid glycosides had LD50 460 mg/kg, i.p. in rats. Glycosides decreased serum cholesterol and total protein and increased blood sugar on single i.p. injection or repeated (7 days) oral dose (100 mg/kg) (*Rastit. Resur.* 1978, *14*, 93; *Chem. Abstr.* 1978, *88*, 115364 f).

CALYCOPTERIS (Combretaceae)

C. floribunda (Roxb.) Poir. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 47).

n-Octacosanol, sitosterol, calycopterin, 3'-O-methylcalycopterin, 4'-O-methylcalycopterin, ellagic acid, quercetin and proanthocyanidin isolated from leaves (*Phytochemistry* 1973, *12*, 2593; *Indian J. Chem.* 1973, *11*, 403); gossypol, calycopterin and quercetin isolated from flowers and heartwood (*Curr. Sci.* 1975, *44*, 888).

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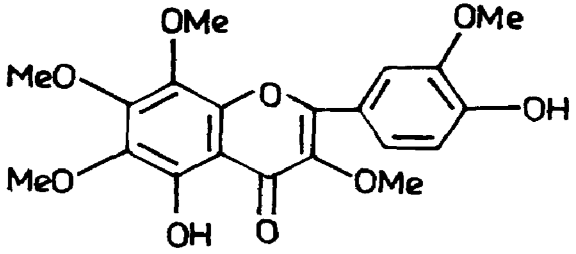

3'-O-Methylcalycopterin

CAMELLIA (Theaceae)

C. sinensis (L.) Kuntze syn. *C. theifera* Griff., *Thea sinensis* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 72).

Theasapogenol B isolated from seeds and characterised as 3β,16α,21β,22α,28-pentahydroxyolean-12-ene (barringtogenol C) (*Chem. Pharm. Bull.* 1970, *18*, 1610); leaf saponin on hydrolysis gave barringtogenol C, A_1-barrigenol, cinnamic, angelic and tiglic acids and arabinose, xylose, galactose and glucuronic acid (*Nippon Nogei Kagaku Kaishi* 1973, *47*, 237; *Chem. Abstr.* 1974, *80*, 68381 g); linolenic acid and cis-3-hexenal isolated from leaves; latter probably produced from linolenic acid by enzymic action in leaves (*Phytochemistry* 1973, *12*, 2341); stigmast-7-en-3β-ol, α-spinasterol and its gentiobioside isolated; two straight chain C_{30} and C_{32} alcohols also present (*Phytochemistry* 1974, *13*, 199); a new flavonol glycoside - quercetin-3-O-fructoglucoside - isolated (*Gazz. Chim. Ital.* 1976, *106*, 1117; *Chem. Abstr.* 1977, *87*, 152510 a); a new triterpene alcohol - eupha-7,24-dienol - isolated from seed oil (*Lipids* 1976, *11*, 434; *Chem. Abstr.* 1976, *85*, 108814 n); quercetin and naringenin fructoglucosides (FG_1 and FG_2) isolated (*Phytochemistry* 1976, *15*, 439).

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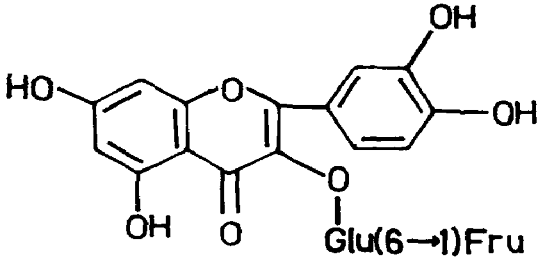
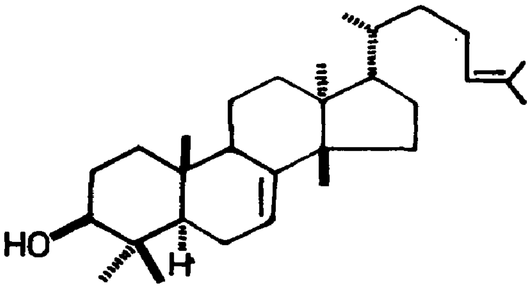


Quercetin-3-O-fructoglucoside



Eupha-7,24-dienol

C. theifera Griff.; see *C. sinensis* (L.) Kuntze

CAMPTERIA (Pteridaceae)

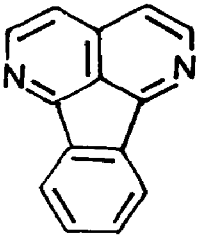
C. wallichiana Moore; see *Pteris wallichiana* Agardh

CANANGA (Annonaceae)

C. odorata Hook.f. & Thoms. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 47).

Canangine was identical with eupolauridine (*Lloydia* 1976, *39*, 459).

NEW COMPOUNDS



Canangine

CANNABIS (Cannabaceae)

C. sativa L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 74).

Cannabis extract caused prolongation of sleeping time in mice which was dose related, being just detectable at 50 mg/kg and 4-fold at 500 mg/kg (*Brit. J. Pharmacol.* 1972, *44*, 250); clinical pharmacology, chemistry and pharmacokinetics of *Cannabis sativa* reviewed (*Indian J. Pharmacol.* 1973, *5*, 406); administration of plant extract (2 mg/day for 45 days) produced complete arrest of spermatogenesis in mice and affected various cellular stages in seminiferous epithelium (*Eur. J. Pharmacol.* 1974, *26*, 111); plant extract increased sensitivity to both painful and painless stimulation and reduced tolerance to pain in man (*J. Pharmacol. Exp. Ther.* 1974, *188*, 415); root extract administered at 0.2 ml/min into cannulated jugular vein of anaesthetised guinea pigs rapidly produced bradycardia, prolonged PR intervals and

blocked A-V conduction (*J. Pharm. Sci.* 1974, *63*, 1169); oral administration of plant powder at 50 mg/kg/day for 35 days to awake unanaesthetised rats caused increase of frequency and amplitude, and some spiking activity in EEG during the first 7-8 days; from 9th day onwards cannabis caused decrease in frequency and amplitude of EEG (*Indian J. Pharmacol.* 1975, *7*, 16); resin produced hypothermia, analgesia and mixed excitation-depression effects, potentiated barbiturate hypnosis and suppressed conditioned avoidance response in rats; it also showed anticonvulsant activity against metrazol-induced and electroshock seizures and antipyretic and anti-inflammatory actions and potentiated d-amphetamine toxicity in aggregated mice (*Indian J. Pharmacol.* 1975, *7*, 51; *J. Res. Indian Med.* 1975, *10*, 49); extract of drug (1 g/100 ml) given orally or i.p. at respective doses of 2 or 0.5-2 ml/100 g activated hypophyseal-adrenal axis in rats as indicated by depletion of adrenal ascorbic acid and cholesterol and increase in plasma corticosterone (*Riv. Tossicol. Sper. Clin.* 1975, *5*, 555; *Chem. Abstr.* 1977, *86*, 133707 h).

Plant extract caused marked reduction in body weight and in weights of seminal vesicles, ventral prostate, epididymis, preputial gland and perineal complex of castrated adult male mice (*Indian J. Physiol. Pharmacol.* 1975, *19*, 98); oral or i.p. administration of alcoholic extract (0.5-2 ml/100 g) to rats had stressor effect on hypophyseal-adrenocortical axis. Effect of physical stress was accentuated by prior treatment with plant extract (*Riv. Tossicol. Sper. Clin.* 1977, *7*, 103; *Chem. Abstr.* 1978, *88*, 32098 w); daily administration of extract (10 mg/day for 14 days, i.p.) produced marked degenerative changes in testes of toad. RNA, protein and sialic acid contents were decreased in testes, whereas testicular cholesterol and alkaline phosphate were elevated. Possibility of adverse effects of marihuana use on functioning of male reproductive organs was alarming (*Indian J. Exp. Biol.* 1977, *15*, 555); on continuous administration of resin, rats rapidly developed tolerance to hypothermic, barbiturate hypnosis potentiating, analgesic and anticonvulsant activities of cannabis. No cross-tolerance between *cannabis* and pentobarbitone observed (*Indian J. Exp. Biol.* 1977, *15*, 280); extract caused significant increase in blood glucose of rats with concomitant fall in glycogen content of liver; maximum changes were observed two hours after i.p. administration of 300 mg/kg in rats (*Indian J. Physio. Pharmacol.* 1978, *22*, 152); dogs that smoked 13 marihuana cigarettes/day retained the daily tetrahydrocannabinol dose of ~2 mg/kg which decreased both respiration and heart rate; after smoking 6 marihuana cigarettes they developed muscular weakness and loss of reflexes (*Toxicol. Appl. Pharmacol.* 1978, *45*, 445; *Chem. Abstr.* 1978, *89*, 209068 k); extract (25,50 and 70 mg/kg, i.p.) produced dose-related potentiation of analgesic action of a sub-analgesic dose of morphine (2.0 mg/kg, i.p.); 50 mg/kg dose induced potentiation of morphine analgesia which was inhibited by pharmacological agents known to reduce brain serotonin activity, but unaffected by drugs reducing brain catecholamine activity (*Indian J. Med. Res.* 1979, *70*, 275).

Friedelin, epifriedelinol and N-(p-hydroxy-β-phenylethyl)-p-hydroxy-trans-cinnamamide isolated from roots (*J. Pharm. Sci.* 1971, *60*, 1891); cannabidivarin and tetrahydrocannabivarin isolated (*J. Pharm. Sci.* 1972, *61*, 1476); in addition to 1-dehydrotetrahydrocannabinol, cannabidiol and cannabinol, their homologs were also present; above-mentioned compounds

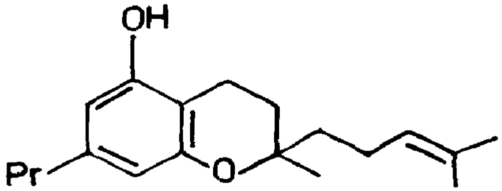
with n-propyl instead of n-pentyl side-chain also identified (*Biochem. Pharmacol. Aspects Depend. Rep. Maurihuana Res. Symp.* [Proc.] 1972, 116; *Chem. Abstr.* 1973, *78*, 2007 s); detection of cannabinol, cannabidiol and tetrahydrocannabinol by TLC (*Rev. Quim. Ind.* 1972, *41*, 15; *Chem. Abstr.* 1972, *77*, 123777 f); isolation and structure of a new cannabinoid - cannabivarichromene (*Experientia* 1973, *29*, 260); structure of a new base - L(+)-isoleucine betaine - isolated from seeds, confirmed by synthesis (*Phytochemistry* 1973, *12*, 2457); detection of cannabidiolic and tetrahydrocannabinolic acids by preparative TLC (*Ann. Farm. Fr.* 1973, *31*, 181; *Chem. Abstr.* 1973, *79*, 134329 d); longifolene, humulene epoxides I and II, caryophyllenol I and m-mentha-1,8(9)-dien-5-ol from essential oil (*Tetrahedron Lett.* 1973, 2841); zeatin and zeatin nucleoside from seeds (*Phytochemistry* 1974, *13*, 282); 9-dehydro-trans- tetrahydrocannabivarin, a mixture of campesterol, stigmasterol and β-sitosterol and proline isolated (*J. Pharm. Sci.* 1974, *63*, 154); a new cannabinoid - cannabicitran - isolated from Lebanese plant and characterised (*Phytochemistry* 1974, *13*, 619).

Stigmast-4-en-3-one, campest-4-en-3-one, stigmast-4,22-dien-3-one, stigmast-5-en-3β-ol-7-one, campest-5-en-3β-ol-7-one and stigmast-5,22-dien-3β-ol-7-one from roots (*Phytochemistry* 1975, *14*, 580); structure of a new alkaloid - cannabisativine - isolated from roots (*Tetrahedron Lett.* 1975, 2815; *J. Pharm. Sci.* 1976, *65*, 1084); vitexin, isovitexin, orientin and acyl derivative of apigenol isolated (*Arch. Farm.* 1975, *25*, 319; *Chem. Abstr.* 1976, *85*, 90155 m); isolation and structure of a new cannabinoid - (+)cannabitriol (*Experientia* 1976, *32*, 283; *Lloydia* 1977, *40*, 275); N-acetylglucosamine and N-acetylgalactosamine isolated from leaves and stems (*Phytochemistry* 1976, *15*, 325); isolation and crystal structure of cannabispiran (*Chem. Commun.* 1976, 580); ten flavonoid glycosides isolated from leaves; one of these was an acylated O-glucoside of apigenol, whereas others identified as O-glycosides of vitexin, isovitexin and orientin; orientin also obtained (*Plant. Med. Phytother.* 1976, *10*, 144; *Chem. Abstr.* 1977, *86*, 27653 c); 9,10-dihydroxy-6a(10a)dehydro-tetrahydrocannabinol(cannabitriol) and (-)10-ethoxy-9-hydroxy-6a(10a)-dehydro-tetrahydrocannabinol (I) isolated and characterised (*Lloydia* 1977, *40*, 275; *Experientia* 1978, *34*, 1127); n-alkanes ranging from C_9 to C_{39}, 2-methyl alkanes, 3-methyl alkanes and dimethyl alkanes present in essential oil (*Phytochemistry* 1977, *16*, 719); friedelin, epifriedelinol, β-sitosterol, carvone, dihydrocarvone and some unidentified bases isolated from roots (*Plants Med.* 1977, *32*, 378).

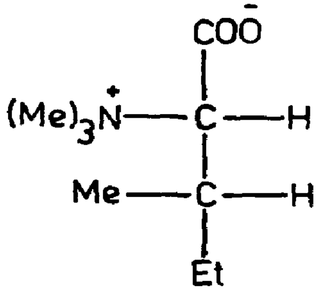
A new cannabinoid - cannabinodiol - isolated and its structure confirmed by synthesis (*Phytochemistry* 1977, *16*, 595); isolation and structure of 1-dehydro-3,4-cis-tetrahydrocannabinol (II) (*Phytochemistry* 1977, *16*, 1088); a new non-cannabinoid phenol - β-cannabispiranol - isolated and characterised as 7′-hydroxy-5′-methoxyspiro (cyclohexane-1,1′-indan)-4β-ol (*Experientia* 1977, *33*, 848); four new cannabinoids - tetrahydrocannabivarinic acid, cannabidivarinic acid, cannabichromevarinic acid and cannabigerovarinic acid - isolated from Thai plant (*Chem. Pharm. Bull.* 1977, *25*, 2306); improved method for synthesis of dl- cannabichromene (*J. Heterocycl. Chem.* 1978, *15*, 699); structure of hydroxy and methoxy substituted 1,2-diphenylethanes (III, IV, V) isolated from Mexican marihuana (*Rec. Trav. Chim. Pays-Bas Belg.* 1978, *97*, 221; *Chem. Abstr.* 1978, *89*, 160092 x); 2″-O-glucopyranosylvitexin and 2″-O-glucopyranosylorientin isolated along with orientin

(*Phytochemistry* 1978, 17, 824); isolation and structures of three new cannabinoids - C3-cannabichromanone, C3-cannabielsoin and C3-cannabielsoic acid B; C3-homolog and C3-homologous acid also isolated (*J. Chromatogr.* 1978, *154*, 13); structures of two new spiro-compounds - cannabispirol and acetylcannabispirol - isolated along with cannabispirone and cannabispirenone from Japanese cannabis (*Chem. Pharm. Bull.* 1978, *26*, 3641); isolation and structure of a new cannabinoid - (±)8,9-dihydroxy-9a(10a)-dehydro-tetrahydrocannabinol (VI) (*Experientia* 1978, *34*, 1127); structure of a new alkaloid - anhydrocannabisativine - isolated from leaves and roots of Mexican plant (*J. Pharm. Sci.* 1978, *67*, 124); structure elucidation of canniprene and two dihydrostilbenes (VII and VIII) isolated from leaves of Thailand plant (*Tetrahedron Lett.* 1978, 4711); isolation and structure of a new cannabinoid - cannabicoumaronone (*Tetrahedron* 1978, *34*, 3207).

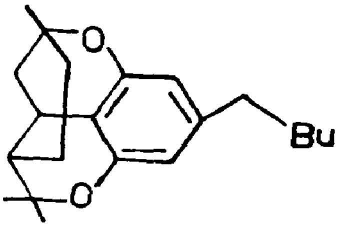
NEW COMPOUNDS



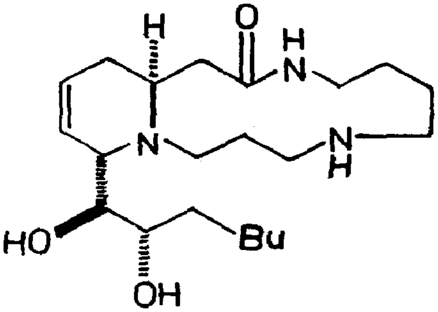
Cannabivarichromene



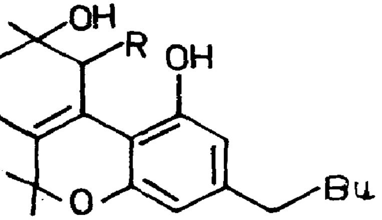
L(+)Isoleucine betaine



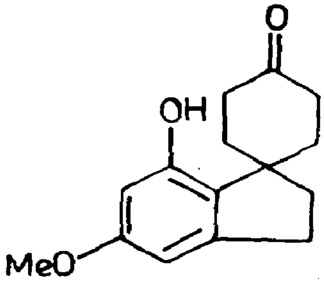
Cannabicitran



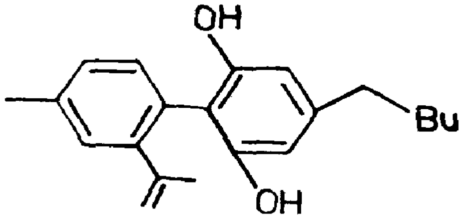
Cannabisativine



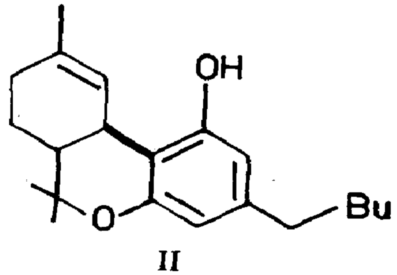
Cannabitriol
R = OH
I
R = OEt



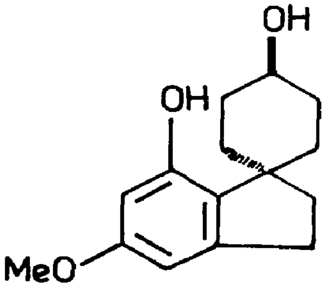
Cannabispiran



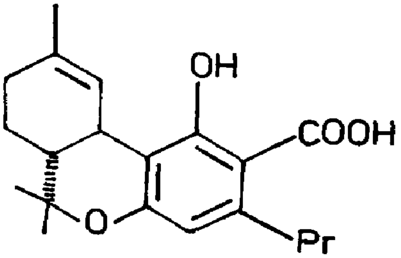
Cannabinodiol



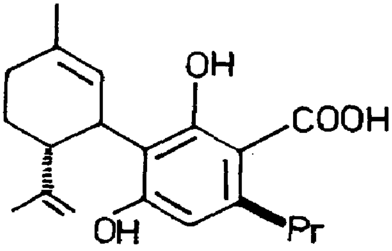
II



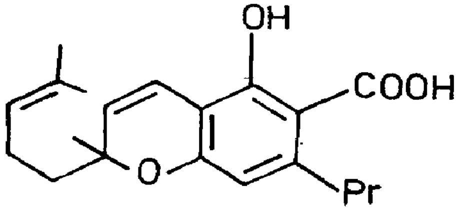
β-Cannabispiranol



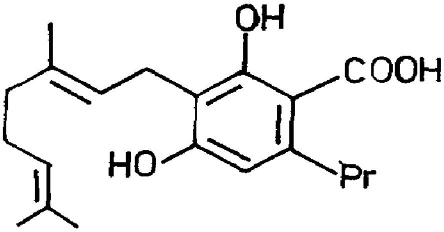
Tetrahydrocannabivarinic acid



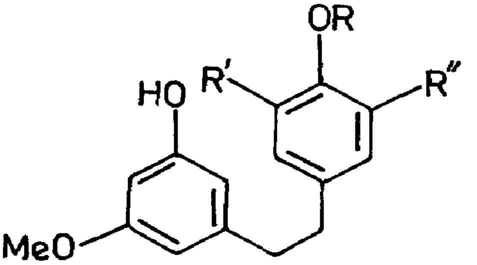
Cannabidivarinic acid



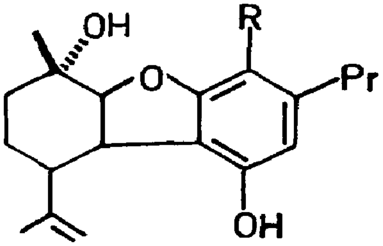
Cannabichromevarinic acid



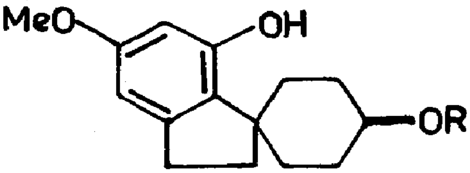
Cannabigerovarinic acid



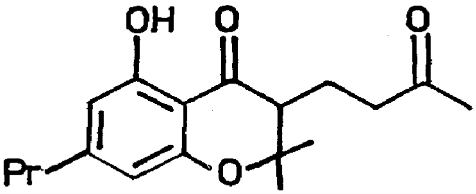
III
R,R′, R″ = H
IV
R = Me, R′ = OH, R″ = H
V
R = H, R′ = OMe, R″ = $CH_2CH=CMe_2$



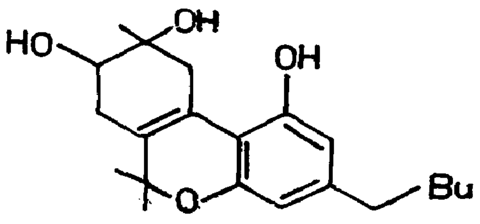
C_3-Cannabielsoin
R = H
C_3-Cannabielsoic acid B
R = COOH



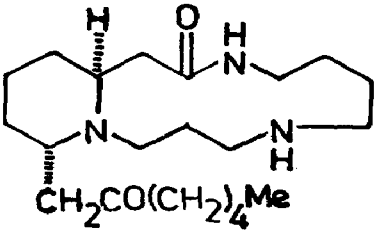
Cannabispirol
R = H
Acetylcannabispirol
R = Ac



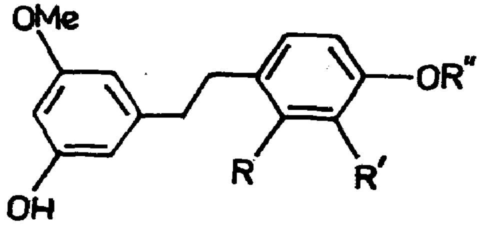
C_3-Cannabichromanone

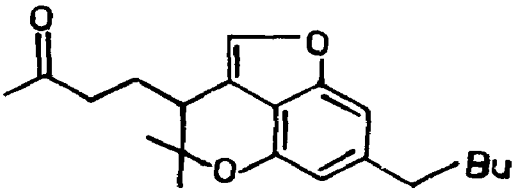


VI



Anhydrocannabisativine





Canniprene
R = $CH_2CH=CMe_2$, R′ = OH, R″ = Me
VII
R,R′,R″ = H
VIII
R = H, R′ = OH, R″ = Me

Cannabicoumaronone

BIOLOGICAL ACTIVITY

Note: 1-Dehydro-tetrahydrocannabinol (1-dehydro-THC) is frequently referred to in literature as 9-dehydro-tetrahydrocannabinol(9-dehydro-THC) and similarly, 6-dehydro-THC is also mentioned as 8-dehydro-THC. In order to avoid confusion, in this write-up 1-dehydro-THC and 6-dehydro-THC are uniformly used for 9-dehydro-THC and 8-dehydro-THC respectively, irrespective of the nomenclature used in under-mentioned papers.

Both cannabinol (CBN) and 1-dehydro-THC exhibited dose-dependent depression of intestinal motility in mice, the latter being 8 times as potent as the former. Cannabidiol (CBD) was inactive in doses upto 50 mg/kg but its combination with 1-dehydro-THC produced greater depression of intestinal motility (*J. Pharm. Pharmacol.* 1974, *26*, 136); 1-dehydro-THC (10 or 20 mg/kg/day X 10 days, s.c.) inhibited rat intestinal movement (*Indian J. Biochem. Biophys.* 1977, *14*, 93).

1-Dehydro-THC (10 or 20 mg/kg i.p.) had enhanced central depressant effect in mice when its hydroxylation to 7-hydroxy metabolite was blocked by i.p. administration of 12.5 or 25 mg/kg of SKF 525-A (β-diethylaminoethyl-diphenylpropyl acetate hydrochloride) (*Eur. J. Pharmacol.* 1970, *13*, 134); 1-dehydro-THC (1 mg/kg) caused immediate and prolonged fall in blood pressure and reduction in pulse rate in urethane-anaesthetised sham- operated rats and depressor response of shorter duration in adrenalectomised rats; duration of bradycardia was similar in both groups (*Clin. Exp. Pharmacol. Physiol.* 1978, *5*, 207; *Chem. Abstr.* 1978, *89*, 157343 z); 1-dehydro-THC produced bronchodilation in asthmatic patients (*Brit. J. Clin.

Pharmacol. 1978, 5, 523; *Chem. Abstr.* 1978, *89*, 123263 h).

6-Dehydro-THC produced hypothermia and caused an increase in d-amphetamine-induced hypothermia in rats kept at 4° (*Int. J. Neurosci.* 1978, *8*, 65; *Chem. Abstr.* 1978, *89*, 140507 h); 1-dehydro-THC, 11-hydroxy-1-dehydro-THC and 1-nor-1β-hydroxy-hexahydrocannabinol also produced hypothermia and increased catecholamine synthesis in mouse brain (*Res. Commun. Chem. Pathol. Pharmacol.* 1978, *20*, 51; *Chem. Abstr.* 1978, *89*, 36743 w).

1-Dehydro-THC and 6-dehydro-THC decreased the response rate of pigeons in schedule-controlled behaviour tests but CBN even at relatively high doses had no effect; pigeons were affected at lower doses of 1-dehydro-THC than rats (*J. Pharmacol. Exp. Ther.* 1971, *178*, 241); effects of 1-dehydro-THC and 6-dehydro-THC were studied by stimulating primary somatosensory cortex in squirrel monkey and recording the responses in frontal lobe polysensory areas ipsi- and contralateral to the stimulus; low doses of both compounds increased amplitudes of the responses and higher doses generally decreased them (*J. Pharmacol. Exp. Ther.* 1971, *176*, 480).

1-Dehydro-THC, 6-dehydro-THC and CBN showed a dose-dependent antinociceptive effect after oral administration to mice. They produced dose-dependent depression in the passage of charcoal meal in mice; the former two were equipotent and about one-fifth as potent as morphine (*Brit. J. Pharmacol.* 1973, *49*, 588); 1- and 6-dehydro-THC produced a dose-related transient increase in blood pressure followed by prolonged hypotensive response and bradycardia after i.v. administration. Both showed peripheral vasoconstrictor activity (*J. Pharmacol. Exp. Ther.* 1976, *196*, 649).

1-Dehydro-THC was found to be a potent stimulant of ACTH secretion; low doses which were inactive in unanaesthetised rats stimulated ACTH secretion in pentobarbital-anaesthetised rats. A nonstimulating dose of 1-dehydro-THC did not block secretion of ACTH induced by epinephrine (*Eur. J. Pharmacol.* 1970, *12*, 382); it was found to be an orally effective anti-oedema and analgesic agent. In carrageenin-oedema, its activity was 20 times that of aspirin and nearly twice that of hydrocortisone. It also effectively inhibited developing adjuvant-induced arthritis (*J. Pharmacol. Exp. Ther.* 1973, *186*, 646); (-)trans-1-dehydro-THC and aqueous extract and volatile oil of cannabis prolonged hexobarbitol sleeping time in mice in that order of potency (*J. Pharm. Sci.* 1974, *63*, 962).

Administration of 1-dehydro-THC (39μg-2.5 mg/kg, i.p.) decreased blood pressure, heart rate, cardiac output and right ventricular contractile force in dose-related manner in intact anaesthetised dogs (*Eur. J. Pharmacol.* 1973, *24*, 243); 1-dehydro-THC (30 mg) increased pulse rate, disturbed time tasks and induced strong psychological reaction in man. CBD (15-60 mg) alone produced no effect but blocked most of the effects of 1-dehydro-THC when both were given together (*Eur. J. Pharmacol.* 1974, *28*, 172).

1-Dehydro-THC produced a dose-dependent prolongation of ether anaesthesia upto the highest dose of 40 mg/kg at which 4 of the 20 animals tested became cyanotic and died. Prolongation of anaesthesia produced by CBN at doses of 10 mg/kg and above was not dose-dependent; at 20 mg/kg only 4 of 15 mice were anaesthetised with ether whereas lower

doses (mg/kg) were ineffective (*J. Pharm. Pharmacol.* 1975, *27*, 610).

1-Dehydro-THC (50 mg/kg) completely abolished seizures after a single injection but tolerance developed and no protection was afforded after six daily doses. Severe toxic signs with marked depression of spontaneous motor activity became evident at higher dose level (*Eur. J. Pharmacol.* 1975, *31*, 148); at 1.84 mg/kg, i.v. it effectively reduced amplitude of experimentally induced cough response in cats. This activity was similar to that of codeine (*Eur. J. Pharmacol.* 1976, *35*, 309); 1-dehydro-THC (2.5 mg/kg, i.v.) decreased heart rate and pulmonary blood flow but caused a significant increase in pulmonary artery pressure and total pulmonary vascular resistance in anaesthetised dogs (*Eur. J. Pharmacol.* 1976, *38*, 183); 1-dehydro-THC in doses of 0.25 and 0.1 mg/kg reduced maximal heart rate by 48 and 41% respectively, without any significant change in blood pressure, in conscious dogs; it caused peak reduction in heart rate of 38 and 34% and in blood pressure of 24 and 8% in anaesthetised dogs at doses of 0.5 and 0.25 mg/kg respectively (*Brit. J. Pharmacol.* 1977, *59*, 561); 1-dehydro-THC reduced blood pressure of conscious hypertensive cat at 25 mg/kg p.o. (*Arch. Int. Pharmacodyn. Ther.* 1978, *236*, 76; *Chem. Abstr.* 1978, *89*, 191027 j).

1-Dehydro-THC lowered normal intraocular pressure by 15 to 50% in all human subjects at i.v. dosage of 1.5 to 3.0 mg. It also showed moderate cardio-acceleratory effect (*Ther. Potential Marihuana. Proc. Conf.* 1976, 77; *Chem. Abstr.* 1978, *88*, 45128 f); 1-dehydro- THC (0.022 and 0.044 mg/kg) administered i.v. to humans decreased intraocular pressure (average 37%). Heart rate increased by 22% to 65% and anxiety levels were also increased over placebo and diazepam (*South. Med. J.* 1977, *70*, 951; *Chem. Abstr.* 1977, *87*, 194163 v); acute administration of 1-dehydro-THC depressed serum thyroxine concentration in rats. These studies suggested that the site of drug action lay somewhere in central nervous system (*J. Pharm. Pharmacol.* 1977, *29*, 778).

1-Dehydro-THC (0.625-5.0 mg/kg, i.m.) caused reversible depression in luteinizing hormone levels in ovariectomised female monkey (*Am. J. Obstet. Gynecol.* 1977, *128*, 635; *Chem. Abstr.* 1977, *87*, 161581 b); it had biphasic action with regard to amphetamine-induced aggregate toxicity in mice, showing depressant effect at lower dose (0.75 mg/kg) and stimulant at higher dose (3.0 mg/kg) (*Curr. Ther. Res. Clin. Exp.* 1977, *21*, 241; *Chem. Abstr.* 1977, *86*, 165357 k); maximisation test in guinea pigs and mast cell degranulation test in sensitised guinea pig serum indicated that 1-dehydro-THC was extremely allergenic and that the immune response to it was accompanied by antibody formation (*C. R. Hebd. Seances Acad. Sci. Ser.* D 1977, *285*, 1351; *Chem. Abstr.* 1978, *88*, 69201 a); 1-dehydro-THC (5-30 mg/kg, i.p.) in rats caused complex behavioural response including stereotypy followed by catatonia and hyperreactivity to external stimuli as well as dose-dependent hyper- or hypothermia (*Boll. Soc. Ital. Biol. Sper.* 1978, *54*, 2348; *Chem. Abstr.* 1979, *91*, 83433 w); rats pretreated daily with 1-dehydro-THC (8 mg/kg) for 14 days showed tolerance to 9-dehydro-THC-induced-hypothermia and depression of conditioned avoidance response acquisition in a shuttle box (*Arch. Int. Pharmacodyn. Ther.* 1978, *231*, 49; *Chem. Abstr.* 1978, 89, 16935 g); anti-ulcer activity of 1-dehydro-THC in pylorus- ligated rat was less than that of tridihexethyl chloride (*Pharmacology* 1978, *17*, 173; *Chem. Abstr.* 1978, *89*, 191074 x).

1-Dehydro-THC decreased species specific attack behaviour in mice, rats, squirrels and monkeys at doses (0.25-2.0 mg/kg) which had no effect on other elements of behavioural repertoire (*Science* 1978, *199*, 1459); oral administration of cannabis resin and 1-dehydro-THC to male rats produced changes in androgenic steroids and their metabolites, a significant decrease in testosterone concentration, a dose-response related elevation of 16-dehydroandrosten-3β-ol, a three-fold increase of androstanediol and elevated levels of anderosterone being observed in urine (*Experientia* 1978, *34*, 88).

1-Dehydro-THC prolonged pentobarbitone sleep and inhibited phenazone metabolism but its action was limited and could not account for the effect of the extract. On the other hand, cannabidiol (CBD) was strongly active in both the tests, *in vivo* 39.8 μM/kg prolonged sleep by 190% and *in vitro* 12.7 μM inhibited phenazone metabolism by 20%; these actions were dose-related and could account for the effect of extract (*Brit. J. Pharmacol.* 1972, *44*, 250); CBD at high doses showed some protection against electroshock seizures in rats; ED50 for inhibition of tonic extensor phase was 3 mg/kg (*J. Pharm. Pharmacol.* 1973, *25*, 916); CBD at 10-200 mg/kg, i.p. significantly protected mice from convulsant and lethal effects of laptazole (*J. Pharm. Pharmacol.* 1973, *25*, 664); comparative studies of anticonvulsant and neurotoxic effects of CBD, 1-dehydro-THC and CBN showed that CBD was a more potent anticonvulsant (*J. Pharmacol. Exp. Ther.* 1977, *201*, 26).

Abnormal-8-dehydro-THC failed to elicit CNS and cardiovascular effects in laboratory animals; abnormal-cannabidiol was also devoid of behavioural effects but showed marked hypotension with only slight bradycardia in anaesthetised dogs (*Experientia* 1977, *33*, 1204); flavocannabiside and flavosativaside at 10 μM *in vitro* weakly inhibited rat lens aldose reductase (*J. Pharm. Sci.* 1977, *66*, 1358).

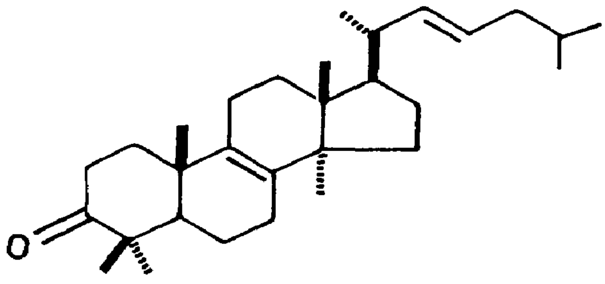
CANSCORA (Gentianaceae)

C. decussata (Roxb.) J. A. Schult & J. H. Schult (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 75).

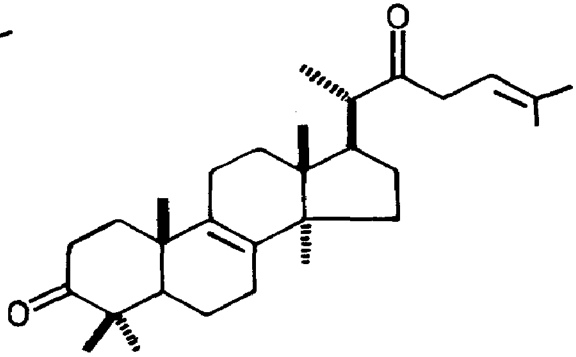
Gluanone, canscoradione, friedelin, friedelan-3β-ol, β-amyrin, sitosterol, stigmasterol and campesterol isolated from aerial parts (*Phytochemistry* 1973, *12*, 1763); new xanthones - 1,3,6,7-tetrahydroxyxanthone (I), 1,3,5,6-tetrahydroxyxanthone-2C-glucoside (II) and 1,5,6-trihydroxy-3-methoxyxanthone (III) - isolated and characterised (*Phytochemistry* 1973, *12*, 2035); new xanthones - xanthone A, xanthone B and xanthone C - isolated and characterised (*J. Pharm. Sci.* 1973, *62*, 137); structures of three xanthones revised to 1-hydroxy-3,5,6,7-tetramethoxy-, 1,7-dihydroxy-3,5,6-trimethoxy- and 1,6,7-trihydroxy-3,5-dimethoxy- xanthones; another new xanthone - 1,3,7-trihydroxy-5,6-dimethoxyxanthone - isolated and characterised (*J. Chem. Soc.* Perkin 1 1974, 2538); (-)loliolide isolated (*J. Pharm. Sci.* 1976, *65*, 1549); 1-methoxy-3,5-dihydroxyxanthone (IV) and its 3-O-rutinosyl derivative (V) isolated from aerial parts (*Phytochemistry* 1976, *15*, 1041); two new xanthone glucosides and two free xanthones isolated and identified as 1-glucosyloxy-3-hydroxy-5-methoxy- (VI), 7-glucosyloxy-1,6-dihydroxy-3,5-dimethoxy-(VII), 1,5,6-trihydroxy-3,7-dimethoxy-(VIII) and 1,5,7-trihydroxy-3,6-dimethoxy-xanthones (IX); structures of the two previously reported

xanthone-4 and xanthone-12 reassigned as 1,3,5-trihydroxy-6,7-dimethoxy- (X) and 1,5-dihydroxy-3,6,7-trimethoxy xanthones (XI) respectively (*J. Chem. Soc.* Perkin 1 1977, 1597).

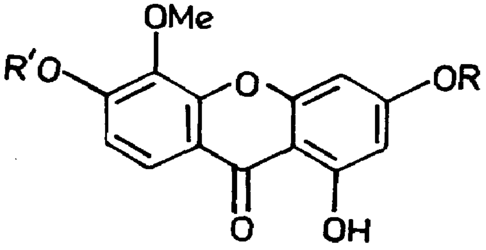
NEW COMPOUNDS



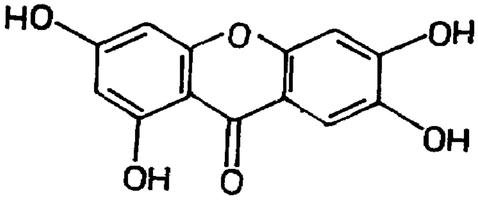
Gluanone



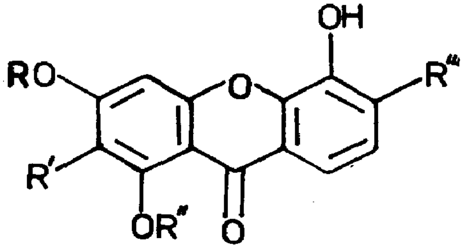
Canscoradione



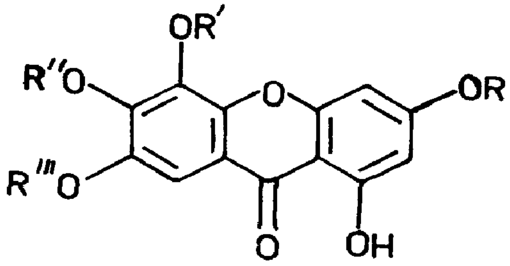
Xanthone A
R,R′ = Me
Xanthone B
R, = Me, R′ = H
Xanthone C
R,R′ = H



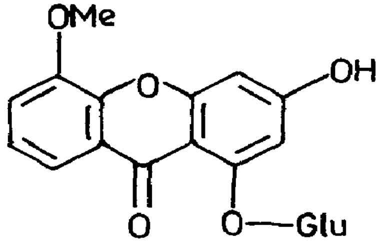
I



II
R = H, R′ = Glu, R″ = H, R‴ = OH
III
R = Me, R′,R″ = H, R‴ = OH
IV
R,R′,R‴ = H, R″ = Me
V
R = Rutinose, R′,R‴ = H, R″ = Me



VII
R,R′ = Me, R″ = H, R‴ = Glu
VIII
R,R‴ = Me, R′,R″ = H
IX
R,R″ = Me, R′,R‴ = H
X
R,R′ = H, R″,R‴ = Me
XI
R,R″,R‴ = Me, R′ = H



VI

BIOLOGICAL ACTIVITY

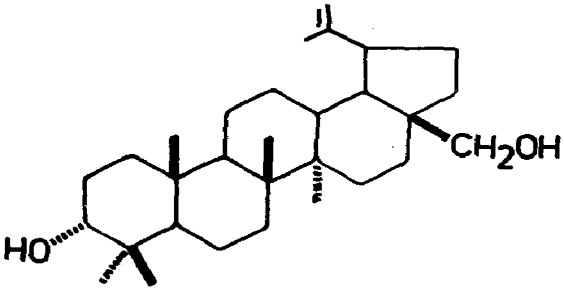
Mangiferin stimulated CNS, potentiated subanalgesic doses of morphine and exerted cardiostimulant and hydrocholeretic action on i.p. administration to mice, rats and dogs (*J. Pharm. Sci.* 1972, *61*, 1838); CNS stimulation, reported above, was ascribed to sodium carbonate solution (2%) which was used as solvent; however, mangiferin showed significant anti-inflammatory activity in rats (*Indian J. Pharm. Sci.* 1979, *41*, 78).

CANTHIUM (Rubiaceae)

C. dicoccum (Gaertn.) Teijsm. & Binn. syn. *C. didymum* Gaertn., *Plectronia didyma* Kurz (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 49).

Isolation and structure elucidation of 3-epibetulin (*Chem. Ind.* 1977, 1331); α-amyrin and oleanolic acid isolated from bark (*J. Indian Chem. Soc.* 1975, *52*, 1112).

NEW COMPOUNDS



3-Epibetulin

C. didymum Gaertn.; see *C. dicoccum* (Gaertn.) Teijsm. & Binn.

CAPPARIS (Capparaceae)

C. aphylla Roth; see *C. decidua* (Forsk.) Edgew.

C. decidua (Forsk.) Edgew. syn. *C. aphylla* Roth (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 75).

Fruits, leaves, bark and roots claimed to relieve a variety of ailments such as toothache, cough, asthma, intermittent fever and rheumatism; also useful in cardiac troubles and biliousness (*Proc. Nat. Acad. Sci.* India 1972, *42*A, 24; *Chem. Abstr.* 1974, *80*, 68375 h).

A glucoside - glucocapparin - composed of methyl isothiocyanate and glucose isolated from seeds (*Res. Bull. Punjab Univ. Sci.* 1970, *21*, 519; *Chem. Abstr.* 1972, *77*, 72529 s); arabinose, galactose and polyphenols present in plant (*Proc. Nat. Acad. Sci.* India 1972, *42*A, 24; *Chem. Abstr.* 1974, *80*, 68375 h).

C. sepiaria L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 49).

α-Amyrin, β-amyrin, taraxasterol and erythrodiol isolated from leaves (*J. Indian Chem. Soc.* 1970, *47*, 751); β-sitosterol, betulin and a triterpenoid alcohol, mp. 164°, isolated from leaves (*Res. Bull. Punjab Univ. Sci.* 1970, *21*, 23; *Chem. Abstr.* 1972, *76*, 83591 m).

C. spinosa L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 50).

Juice and volatile fraction from leaves showed anticystic, fungicidal, bactericidal and phytoncidal activities (*Azerb. Med. Zh.* 1978, *55*, 70; *Chem. Abstr.* 1978, *89*, 87180 t).

Quercetin-3-rutinoside and kaempferol-3-rutinoside isolated from floral buds (*Rev. Agroquim. Tecnol. Aliment.* 1976, *16*, 568; *Chem. Abstr.* 1977, *86*, 185906 s); kaempferol-3-O-rhamnorutinoside isolated from floral buds (*Rev. Agroquim. Tecnol. Aliment.* 1978, *18*, 232; *Chem. Abstr.* 1979, *90*, 100117 v); leaves contained alkaloids (0.02), reducing sugars (1.68), fats (0.71), resins (2.2%), ascorbic acid (70.8 mg%), and tannins; fruit contained alkaloids (0.074), glycosides (0.083) reducing sugars (32.9), fats (3.75), resins (23.75), total titratable acid (14.1%), and ascorbic acid (135.5 mg%) (*Azerb. Med. Zh.* 1978, *55*, 70; *Chem. Abstr.* 1978, *89*, 87180 t).

CAPSELLA (Brassicaceae)

C. bursa-pastoris (L.) Medik. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 76).

Hesperidin and rutin isolated from leaves, flowers and shoots (*Farmatsiya* 1973, *22*, 34; *Chem. Abstr.* 1974, *80*, 24822 x); luteolin-7-rutinoside, quercetin-3-rutinoside, luteolin-7-galactoside, β-sitosterol, sinigrin and α-methylsulfinylnonyl and 10-methylsulfinyldecyl glucosinolates isolated and identified (*Egypt. J. Pharm. Sci.* 1977, *16*, 521; *Chem. Abstr.* 1978, *89*, 160097 c).

BIOLOGICAL ACTIVITY

Hesperidin and rutin reduced permeability of blood vessel walls in mice (*Farmatsiya* 1973, *22*, 34; *Chem. Abstr.* 1974, *80*, 24822 x).

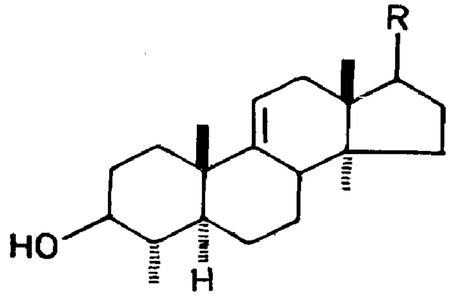
CAPSICUM (Solanaceae)

C. annuum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 76).

Fructose, galactose, sucrose, fructosylsucrose, planteose, planteobiose, 4α-D-glucopyranosylplanteose and 4α-maltopyranosylplanteose isolated as free sugars (*An. Quim.* 1972, *68*, 1307; *Chem. Abstr.* 1973, *78*, 121338 k); luteolin-7-glucoside and luteolin-7-diglucoside

isolated from leaves (*Fitoterapia* 1973, *44*, 80); capsaicin identified in fruits (*Proc. Indian Acad. Sci.* 1973, 77B, 196; *Chem. Abstr.* 1973, *79*, 123698 x; *Rev. Cubana Farm.* 1978, *12*, 335; *Chem. Abstr.* 1979, *91*, 120382 b); a 22-hydroxyfurostanol glycoside - capsicoside - isolated from seeds; its enzymatic cleavage leads to capsicosin by spontaneous cyclisation of sidechain (*Chem. Ber.* 1975, *108*, 265); lanosterol, lanostenol, cycloartenol and cycloartanol isolated from seeds (*Steroids* 1977, *29*, 569); cholesterol (8.0), 24-methylcholesterol (11.0), 24-ethylcholesterol (59.0), stigmasterol (8.0), 24-methylcholesta-5,24-dienol (tr), 28-isofucosterol (6.0), 24-methylenecholesterol (2.0%), 24-ethylcholesta-5,24-dienol, cholestanol, 24-methylcholestanol, 24-ethylcholestanol, cholest-7-enol and 24-ethylcholest-22-enol isolated from seeds (*Steroids* 1977, *30*, 425); lanost-8-en-3β-ol (16.0), lanosterol (3.0), 24-methylenelanost-8-en-3β-ol (tr), cycloartanol (22.0), cycloartenol (50.0), 24-methylenecycloartanol (2.0), lupeol (2.0), β-amyrin (tr), daturaolone (5%) and daturadiol (tr), isolated from seeds (*Phytochemistry* 1977, *16*, 1723); capsanthin main carotenoid of red fruits; it also occurred as monoester and diester along with cryptocapsin and diester of capsorubin (*Phytochemistry* 1978, *17*, 91); four new 4α-methylsterols - 31-norlanost-9(11)-enol (5.0) (I), 24-methyl-31-norlanost-9(11)-enol (tr) (II), 4α,24-dimethylcholesta-7,24-dienol (tr) (III) and 4α-methyl-24-ethylcholesta-7,24-dienol (1.0%) (IV) along with 31-norcycloartanol (4.0), 31-norcycloartenol (3.0), cycloeucalenol (3.0), 31-norlanost-8-enol (13.0), obtusifoliol (6.0), 4α,14α,24-trimethylcholesta-8,24-dienol (tr), 4α-methylcholest-8-enol (7.0), lophenol (23.0), 24-methyllophenol (tr), 24-ethyllophenol (2.0), gramisterol (5.0), citrostadienol (12.0%) isolated from seed oil (*Phytochemistry* 1978, *17*, 971).

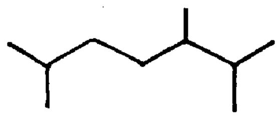
NEW COMPOUNDS

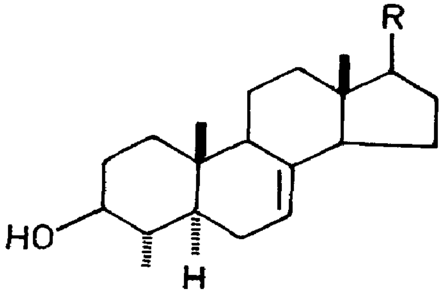


I

R =

II

R = 



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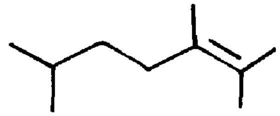
R = 

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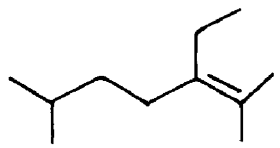
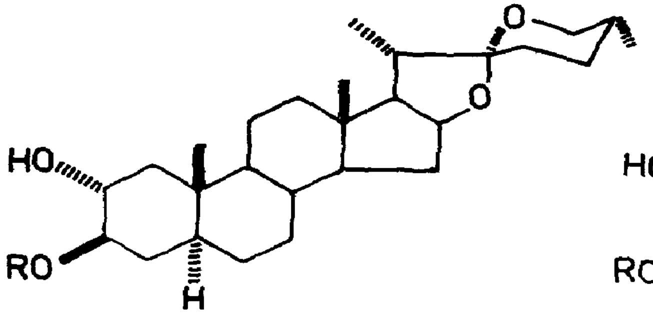
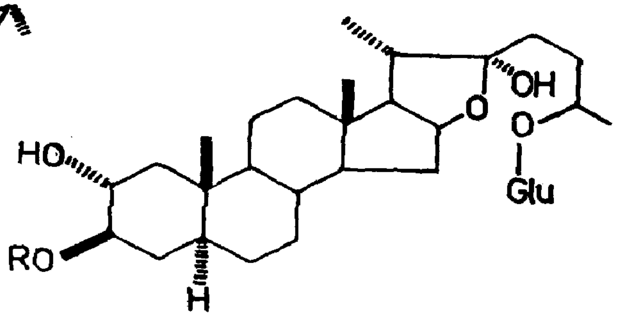
R = 



Capsicosin
R = Glu(3→1)Gal(4→1)Glu[X](3→1)Glu
X = (2→1)Glu



Capsicoside
R = Glu(3→1)Gal(4→1)Glu[X](3→1)Glu
X = (2→1)Glu

BIOLOGICAL ACTIVITY

Capsaicin (10-300 μg/kg, i.v.) caused transient rise in blood pressure in anaesthetised dogs followed by sustained fall, whereas in anaesthetised rabbits it caused hypotension. It also caused a sustained increase in tension of spiral strips of proximal and distal mesenteric arteries and proximal and distal renal arteries of dog (*J. Pharmacol. Exp. Ther.* 1972, *181*, 512); intragastric infusion of capsaicin (10 mg/hr) caused significant increase of DNA content of gastric aspirate (*Indian J. Med. Res.* 1976, *64*, 163).

C. annuum var. *cerasiformis* Irish (*cerasiforme*)

4-Demethylsterols - cholesterol (6.0), 24-methylcholesterol (16.0), 24-ethylcholesterol (49.0), stigmasterol (8.0), 24-methylcholesta-5,24-dienol (tr), 28-isofucosterol (11.0), 24-methylenecholesterol (3.0%), 24-ethylcholesta-5,24-dienol, cholestanol, 24-methylcholestanol, 24-ethylcholestanol, cholest-7-enol and 24-ethylcholest-22-enol identified in seeds (*Steroids* 1977, *30*, 425); lanost-8-en-3β-ol, lanosterol, 24-methylenelanost-8-en-3β-ol, cycloartanol, cycloartenol, 24-methylenecycloartanol, lupeol, β-amyrin, daturaolone and daturadiol isolated from seeds (*Phytochemistry* 1977, *16*, 1723); 31-norlanost-9(11)-enol(15.0), 24-methyl-31-norlanost-9(11)-enol(tr), 4α,24-dimethylcholest-7,24-dienol (tr), 4α-methyl-24-ethylcholest-7,24-dienol (1.0) along with 31-norcycloartanol (3.0), 31-norcycloartenol (9.0), cycloeucalenol (1.0), 31-norlanost-8-enol (7.0), obtusifoliol (3.0), 4α,14α,24-trimethylcholest-8,24-dienol (tr), 4α-methylcholest-8-enol (4.0), lophenol (30.0), 24-methyllophenol (tr), 24-ethyllophenol (tr), gramisterol (5.0), citrostadienol (5.0%) isolated from seed oil (*Phytochemistry* 1978, *17*, 971).

Distribution : Cultivated in India.

C. annuum L. var. *grossum* (Willd.) Sendt. syn. *C. grossum* Willd.

H. & P. - Lalmirch; B. - Lankamorich, Lalmorich; Tam. - Mulagay; Tel. - Mirapakaya.

Fructose, galactose, sucrose, fructosylsucrose, planteose, planteobiose, 4-α-D-glucopyranosylplanteose and 4-α-maltopyranosylplanteose isolated from seeds (*An. Quim.* 1972, *68*, 1307; *Chem. Abstr.* 1973, *78*, 121338 k).

Distribution : Cultivated in India.

C. grossum Willd.; see *C. annuum* L. var. *grossum* (Willd.) Sendt.

CARAGANA (Papilionaceae)

C. pygmaea (L.) DC.

Isorhamnetin-3-O-β-D-galactopyranoside, quercetin-3-O-α-L-rhamnofuranoside and quercetin-3-O-β-D-galactopyranoside isolated (*Mater. Yubileinoi. Resp. Nauchin. Konf. Farm., Posvyashch. SSSR* 1972, 102; *Chem. Abstr.* 1975, *83*, 4962 b).

Distribution : Western Himalayas, alt. 2400-5000 m.

CARALLUMA (Asclepiadaceae)

C. adscendens (Roxb.) Haworth var. *fimbriata* (Wall.) Gravely & Mayur syn. *C. attenuata* auct. (non Wight), *C. fimbriata* Wall.

A hydrocarbon, a glycoside and a waxy solid, mp. 65°, isolated (*J. Shivaji Univ. Sci.* 1976, *16*, 43; *Chem. Abstr.* 1978, *88*, 148997 t).

Distribution : Peninsular India, including Nilgiri and Pulney Hills.

C. attenuata Wight; see *C. adscendens* (Roxb.) Haworth var. *fimbriata* (Wall.) Gravely & Mayur

C. fimbriata Wall.; see *C. adscendens* (Roxb.) Haworth var. *fimbriata* (Wall.) Gravely & Mayur

CARAPA (Meliaceae)

C. granatum (Koen.) Alston; see *Xylocarpus granatum* Koen.

C. moluccensis Hiern; see *Xylocarpus moluccensis* (Lamk.) Roem.

C. moluccensis Lamk.; see *Xylocarpus granatum* Koen.

C. obovata Blume; see *Xylocarpus granatum* Koen.

CARDARIA (Brassicaceae)

C. draba (L.) Desv. syn. *Lepidium draba* L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 51).

Kaempferol-3-β-D-glucofuranosyl-6-β-L-rhamnopyranoside, mp. 195°, quercetin-3-β-D-glucofuranosyl-6-β-L-rhamnopyranoside, mp. 229°, and quercetin-3-β-D-glucopyranoside isolated (*Rastit. Resur.* 1970, *6*, 567; *Chem. Abstr.* 1971, *74*, 95414 c); sulforaphan, a mixture of paraffins, a mixture of higher fatty alcohols and β-sitosterol isolated from fresh juice (*Cesk. Farm.* 1977, *26*, 395; *Chem. Abstr.* 1978, *89*, 12030 k).

CARDIOSPERMUM (Sapindaceae)

C. helicacabum L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi,

1956, p. 51).

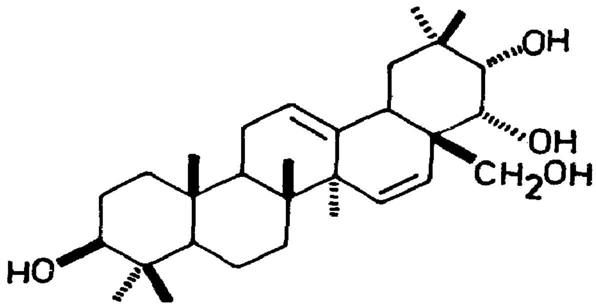
Alkaloid fraction from seeds showed *in vitro* antibacterial action against some pathogenic organisms, caused transient hypotension and cardiac inhibition in anaesthetised dogs. It blocked spasmogenic effects of acetylcholine, histamine and 5-hydroxytryptamine on guinea pig ileum and dog tracheal chain. It had biphasic effect on frog rectus abdominis muscle (*Indian J. Pharm.* 1973, *35,* 40); alcoholic extract of leaves produced cholinergic and antihistaminic effects on CVS and smooth muscles and showed significant anti-inflammatory activity in rats. It also produced CNS depression in near lethal doses and analgesic effect in mice and rats (*Indian J. Physiol. Pharmacol.* 1976, *20,* 203).

CAREYA (Lecythidaceae)

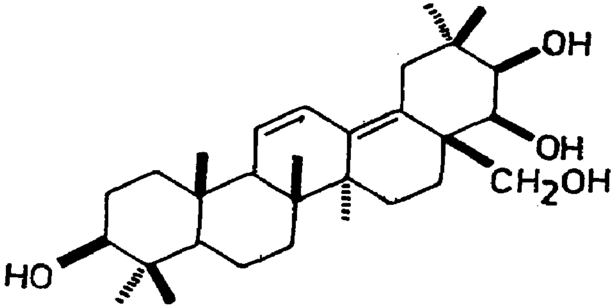
C. arborea Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 77).

α-Spinasterol and α-spinasterone isolated from seeds (*Phytochemistry* 1972, *11,* 2116); careyagenol D isolated from acid hydrolysate of seed saponin and its structure established as olean-12,15-diene-3β,21α,22α,28-tetrol; barringtogenol C, barringtogenol D and 16-deoxybarringtogenol C also isolated (*J. Indian Chem. Soc.* 1973, *50,* 254); a new sapogenol - careyagenol E - isolated from seeds (*Indian J. Chem.* 1974, *12,* 888); hexacosanol, taraxerol, taraxeryl acetate, β-sitosterol, quercetin and ellagic acid isolated from leaves (*Indian J. Pharm.* 1975, *37,* 161); sapogenol A isolated from acid hydrolysate of crude glycosides found identical with barringtogenol B for which revised structure proposed (*J. Indian Chem. Soc.* 1976, *53,* 209).

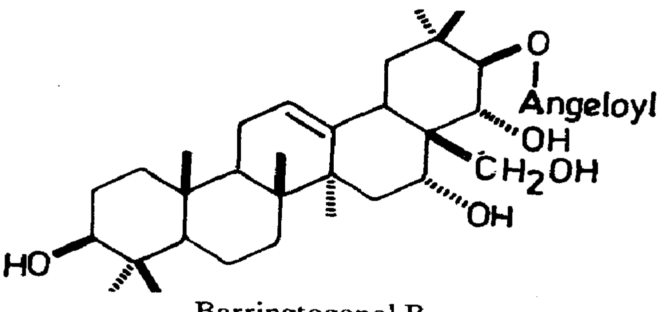
NEW COMPOUDNS



Careyagenol D



Careyagenol E



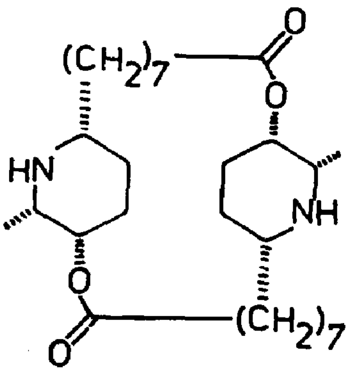
Barringtogenol B

CARICA (Caricaceae)

C. papaya L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 78).

Carpaine isolated from leaves (*Asian J. Pharm.* 1972, *2*, 26; *Chem. Abstr.* 1974, *80*, 33710 m); total alkaloids (0.4%) from leaves; three alkaloids present of which one was carpaine (*Khim. Prir. Soedin.* 1978, *14*, 414; *Chem. Abstr.* 1978, *89*, 143364 v).

NEW COMPOUNDS



Carpaine

BIOLOGICAL ACTIVITY

Carpaine showed antitumor activity *in vitro* against mouse lymphoid leukaemia (L-1210), lymphocytic leukaemia (P-388) and Ehrlich ascites tumor cells (*Asian J. Pharm.* 1972, *2*, 26; *Chem. Abstr.* 1974, *80*, 33710 m); carpaine (0.5-2.0 mg/kg, i.v.) administered to pentobarbital anaesthetised rats decreased systolic, diastolic and mean arterial blood pressure. Carpaine at high dose decreased cardiac output, stroke volume, stroke work and cardiac power, but the calculated total peripheral resistance remained unchanged (*Res. Commun. Chem. Pathol. Pharmacol.* 1978, *22*, 277; *Chem. Abstr.* 1979, *90*, 66761 p).

CARISSA (Apocynaceae)

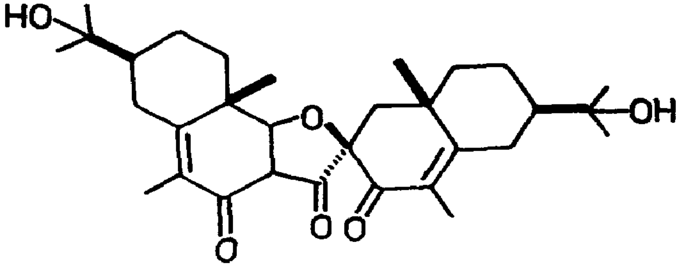
C. carandas L.; see *C. conjesta* Wight

C. conjesta Wight syn. *C. carandas* auct. (non L.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 78).

Plant extract caused vomiting, rhinorrhoea, diarrhoea, tachypnea, exhaustion and death in conscious cats. It showed biphasic hypotensive effect in anaesthetised cat. Root extract showed histamine-releasing activity (*Jap. J. Pharmacol.* 1970, *20*, 367).

Isolation of C_{31}-terpenoid - carindone - and its structure determination (*Phytochemistry* 1972, *11*, 1797).

NEW COMPOUDNS



Carindone

C. opaca Stapf ex Haines syn. *C. spinarum* auct. (non L.) (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 52).

Five cardiac glycosides isolated; three of these identified as odoroside G, odoroside H and euomonoside. Other two compounds B and C were rhamnoside and rhamnoglucoside respectively whose genins not characterised (*Indian J. Chem.* 1969, *7*, 1102).

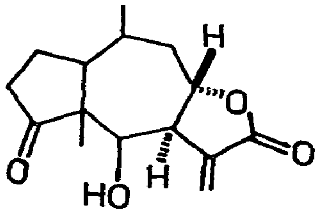
C. spinarum L.; see *C. opaca* Stapf ex Haines

CARPESIUM (Asteraceae)

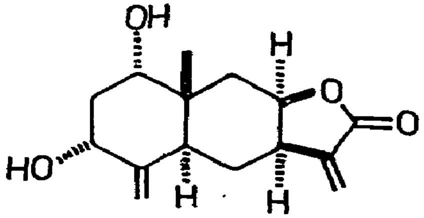
C. abrotanoides L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1956, p. 78).

Granilin isolated and its stereochemistry established (*Phytochemistry* 1975, *14*, 2247); carpesiolin and carabrone isolated; structure of carpesiolin elucidated (*Phytochemistry* 1977, *16*, 782).

NEW COMPOUNDS



Carpesiolin



Granilin

BIOLOGICAL ACTIVITY

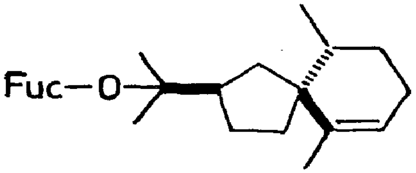
Carpesiolin showed antibacterial whereas carabrone showed antifungal activity (*Phytochemistry* 1977, *16*, 782).

CARTHAMUS (Asteraceae)

C. oxyacantha Bieb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 52).

A new sesquiterpene glycoside - hinesol-β-D–fucopyranoside - isolated from aerial parts (*Chem. Ber.* 1976, *109*, 3953).

NEW COMPOUNDS

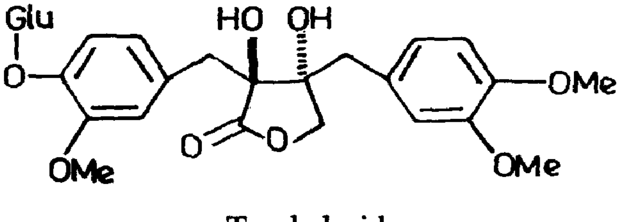


Hinesol-β-D-fucopyranoside

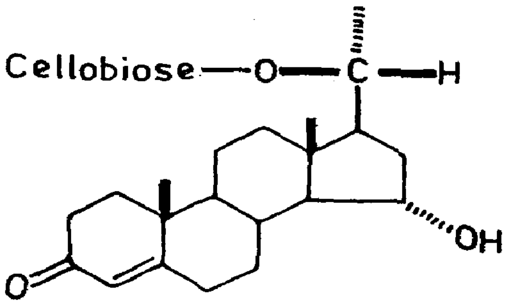
C. tinctorius L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 79).

Isolation and structure elucidation of tracheloside (2-hydroxyarctiin) (*Phytochemistry* 1972, *11*, 2629 2871); a steroid cellobioside (I) isolated from flowers and its structure determined (*Phytochemistry* 1972, *11*, 2327); (Z,Z,Z)1,8,11,14-heptadecatetraene isolated (*Phytochemistry* 1975, *14*, 2085); re- examination of red pigments of flowers showed that carthamin is not a tautomer but a pyridine salt of isocarthamin (*Chem. Lett.* 1978, 643; *Chem. Abstr.* 1978, *89*, 129159 a); three acylserotonins isolated from oil-free safflower identified as N-feruloyl-serotonin, N-p-coumaroylserotonin and N-p-coumaroylserotonin-β-D-glucopyranoside (*Agric. Biol. Chem.* 1978, *42*, 1805; *Chem. Abstr.* 1979, *90*, 19030 q); polyacetylenes-1-tridecene-3,5,7,9,11-pentayne, (11-Z)trideca-1,11-diene-3,5,7,9-tetrayne, (3Z,11Z)trideca-1,3,11-triene-5,7,9-triyne, (3E,5Z,11E)trideca-1,3,5,11-tetraene-7,9-diyne and (3Z,5E,11E) trideca-1,3,5,11-tetraene-7,9-diyne - isolated from flowers (*Phytochemistry* 1978, *17*, 315).

NEW COMPOUNDS



Tracheloside



I

CARUM (Apiaceae)

C. bulbocastanum Koch.; see *Bunium persicum* (Boiss.) Fedtsch.

C. carvi L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, 53).

Trans- and cis- carveol separated from caraway oil (*Pharmazie* 1972, *27*, 340; *Chem. Abstr.* 1972, *77*, 72543 s); lipids from roots contained glyceryl esters of saturated and unsaturated

fatty acids, phytofluene, β-sitosterol, umbelliferone and scopoletin (*Sci. Pharm.* 1973, *41*, 102; *Chem. Abstr.* 1973, *79*, 75880 b); (+)carvone and (+)limonene comprised 87.5% of essential oil from seed (*Can. J. Plant Sci.* 1977, *57*, 543; *Chem. Abstr.* 1977, *87*, 44128 y; *Pakistan J. Sci. Ind. Res.* 1977, *20*, 100; *Chem. Abstr.* 1979, *90*, 121811 g); detection of α-pinene, camphene, β-pinene, myrcene, 3-carene, limonene, γ-terpinene, p-cymene, cadinene, myristicin, carveol acetate, 4-terpineol and perillyl alcohol in essential oil by GLC (*Pakistan J. Sci. Ind. Res.* 1977, *20*, 100; *Chem. Abstr.* 1979, *90*, 121811 g).

C. roxburghianum Benth. & Hook.f.; see *Trachyspermum roxburghianum* (DC.) Wolff

CARVIA (Acanthaceae)

C. callosa (Nees) Bremek. syn. *Strobilanthes callosus* Nees (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 235).

Mixture of n-alkanes containing hentriacontane (36.3), tritriacontane (28.9), nonacosane (21.2), dotriacontane (4.5), triacontane (2.9), heptacosane (2.0), hexatriacontane (1.5), tetratriacontane (1.0), octacosane (1.0%); mixture of n-alcohols containing tetratriacontanol (40.5), triacontanol (4.3), hentriacontanol (3.6%); sterols mixture containing cholesterol (0.4), campesterol (11.0) and stigmasterol (41.5%) and β-sitosterol along with pentacosanoic, hexacosanoic, heptacosanoic, octacosanoic, nonacosanoic, pentatriacontanoic and hentriacontanoic acids analysed from GLC from flowers (*J. Indian Chem. Soc.* 1979, *56*, 315).

CARYA (Juglandaceae)

C. illinoensis (Wang.) Koch. syn. *C. pecan* Engl. & Graebn.

Eng. - Hickory nut, Pecan nut tree.

Flavonol glycosides - azaleatin-3-arabinoside, azaleatin-3-rutinoside, quercetin-3-glucoside and caryatin-3′ (or 4′)-glucoside - isolated from branches (*Z. Naturforsch.* 1977, *32C*, 444; *Chem. Abstr.* 1977, *87*, 65344 f).

Distribution : Native of south-east U.S.A., introduced into India without much success.

C. pecan Engl. & Graebn.; see *C. illinoensis* (Wang.) Koch.

CASIMIROA (Rutaceae)

C. edulis Llave & Lex (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 80).

Imidazole alkaloid - casimiroedine - isolated and its hydrolysis product casimidine synthesised (*J. Am. Chem. Soc.* 1973, *95*, 8737); a histamine-like compound isolated from seeds (*Arch. Invest. Med.* 1978, *9*, 565; *Chem. Abstr.* 1979, *90*, 97588 s).

BIOLOGICAL ACTIVITY

A histamine-like compound showed hypotensive activity in dogs (*Arch. Invest. Med.* 1978, *9*, 565; *Chem. Abstr.* 1979, *90*, 97588 s).

CASSIA (Caesalpiniaceae)

C. absus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 81).

Palmitic, gentisic, 5-O-D-glucopyranosylgentisic acids, ethyl-α-D-galactopyranoside, apigenin, luteolin, hydnocarpin and isohydnocarpin isolated from seeds (*Indian J. Chem.* 1977, *15*B, 764); chrysophanol and aloe-emodin isolated from roots; leaves contained quercetin and rutin; roots and leaves both contained chaksine and isochaksine (*J. Nat. Prod.* 1979, *42*, 299).

C. acutifolia Delile (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 81).

Sennosides A,B,C and D, chrysophanol, emodin and physcion isolated (*Rev. Peru. Bioquim.* 1977, *1*, 31; *Chem. Abstr.* 1978, *88*, 101586 t).

C. alata L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 54).

Chrysophanol, emodin, rhein and aloe-emodin isolated from leaves and fruits (*Asian J. Pharm.* 1976, *3*, 10, 17; *Chem. Abstr.* 1977, *86*, 40173 r; *Curr. Sci.* 1978, *47*, 271; *Rev. Peru. Bioquim.* 1977, *1*, 31; *Chem. Abstr.* 1978, *88*, 101586 t); glycosides of rhein, aloe-emodin and emodin obtained from leaves and fruits (*Rev. Peru. Bioquim.* 1977, *1*, 31; *Chem. Abstr.* 1978, *88*, 101586 t; *Curr. Sci.* 1978, *47*, 271).

C. angustifolia Vahl; see *C. senna* L. var. *senna*

C. auriculata L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 81).

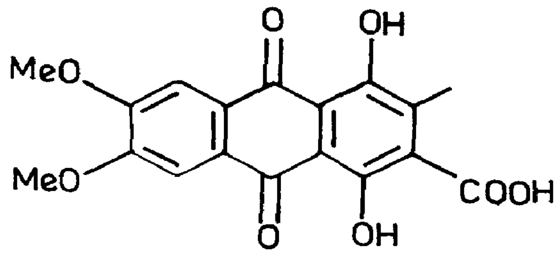
β-Sitosterol and kaempferol isolated from flowers (*Vijnana Parishad Anusandhan Patrika* 1972, *15*, 85; *Chem. Abstr.* 1973, *78*, 2013 r); three new saturated higher fatty ketoalcohols and emodin isolated from leaves (*Planta Med.* 1973, *23*, 363).

C. fistula L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 82).

An aqueous extract of fruit pulp exhibited laxative and antibacterial activities (*Sci. Res.* 1970, *7*, 63; *Chem. Abstr.* 1973, *78*, 1971 q).

Rhein, glucose, sucrose and fructose isolated from fruit pulp (*Sci. Res.* 1970, *7*, 63; *Chem. Abstr.* 1973, *78*, 1971 q); galactomannan isolated from seed composed of D-galactose and D-mannose (*Indian J. Chem.* 1971, *9*, 1085; *Planta Med.* 1976, *30*, 378); fistulic acid isolated from pods and characterised (*Planta Med.* 1972, *21*, 150); kaempferol and a leucopelargonidin tetramer having free glycol unit isolated from flowers (*Indian J. Chem.* 1972, *10*, 379); kaempferol-3-β-glucoside, kaempferol-3-neohesperidoside and clitorin isolated (*Shoyakugaku Zasshi* 1977, *31*, 172; *Chem. Abstr.* 1978, *88*, 148947 b).

NEW COMPOUNDS



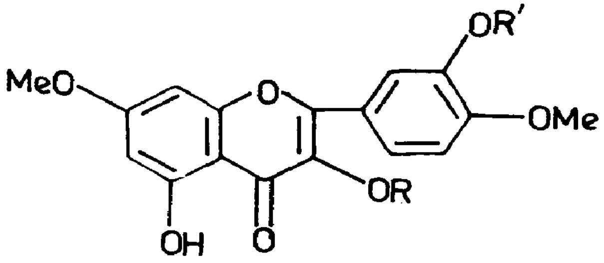
Fistulic acid

C. floribunda Cav. syn. *C. laevigata* Willd.

Two new flavonoids - 3′,5α-dihydroxy-4′,7-dimethoxyflavone-3-O-β-D-galactopyranoside (I) and 5-hydroxy-3′,4′,7-trimethoxyflavone-3-O-β-D-galactosyl-O-β-D-galactopyranoside (II) - isolated from pods along with quercetin (*Planta Med.* 1978, *34*, 319); a new anthraquinone digalactoside - 1-hydroxy-6-methoxy-3-methylanthraquinone-8-O-β-D-galactosyl-(1→4)-galactopyranoside (III) - isolated from pods together with chrysophanol (*Phytochemistry* 1979, *18*, 347).

Distribution : Introduced from tropical America, naturalised in Khasi and Jaintia Hills, Meghalaya, alt. 500-1600 m.

NEW COMPOUNDS

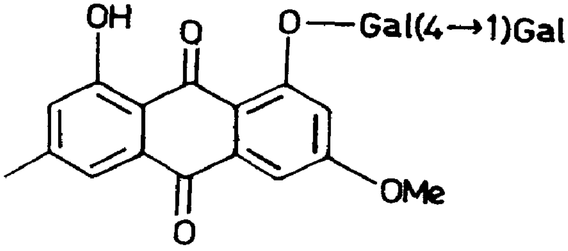


I

R = Gal, R′ = H

II

R = Gal–Gal, R′ = Me



III

C. grandis L.f.

Seed polysaccharide shown to consist of main chain of (1→4) linked galactose and mannose repeating units to which were attached side-chains of (1→3) linked galactose and mannose moieties (*J. Indian Chem. Soc.* 1978, *55*, 1216).

Distribution : Indigenous to Panama, introduced into Indian gardens.

C. javanica L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopara, PID, New Delhi, 1956, p. 54).

Leucocyanidin-4′-O-methyl-3-O-β-D-galactopyranoside, dihydrorhamnetin-3-O-β-D-glucopyranoside, quercetin-3′,4′,7-O-trimethyl-3-O-α-L-rhamnopyranoside and

kaempferol-3-rhamnoglucoside isolated from flowers (*Phytochemistry* 1971, *10*, 2256); hentriacontane, β-sitosterol, its glucoside and cerotic acid isolated from heartwood; octacosanol and β-sitosterol from stem bark; octacosanol and hentriacontanol from leaves (*Planta Med.* 1975, *28*, 190); ceryl alcohol, chrysophanol, piceatannol and (-)epiafzelechin isolated from wood (*Indian J. Chem.* 1978, *16*B, 437); emodin, 5-hydroxyemodin and their 8-O-α-L-rhamnopyranosides isolated from root bark (*Phytochemistry* 1979, *18*, 906).

C. laevigata Willd.; see *C. floribunda* Cav.

C. marginata Roxb.; see *C. roxburghii* DC.

C. mimosoides L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 54).

Emodin and luteolin-7-glucoside isolated from leaves and seeds (*Indian J. Pharm.* 1969, *31*, 110; *ibid.* 1970, *32*, 70); physcion and emodic acid also isolated from roots and seeds (*Indian J. Pharm.* 1970, *32*, 70).

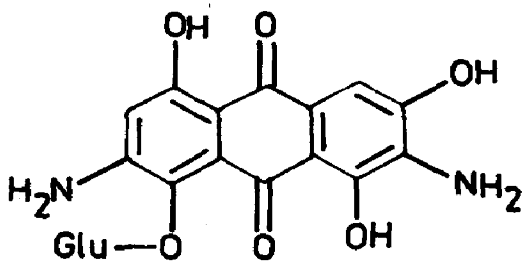
C. multijuga Rich.

A polysaccharide composed of D-galactose, D-mannose and D-xylose in molar ratio of 5:1:2, isolated from seeds (*Carbohydr. Res.* 1979, *72*, 151; *Chem. Abstr.* 1979, *91*, 52689 e).
Distribution : Indigenous to Guiana, introduced into gardens.

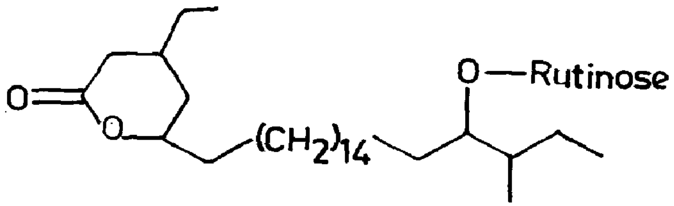
C. nodosa Buch.-Ham. ex Roxb.

A phytosterolin isolated from flowers shown to be an approximately equal mixture of campesterol and β-sitosterol (*Phytochemistry* 1971, *10*, 670); a new glycoside - azralidoside - isolated and characterised as 3-ethyl-23-methyl-22-(β-rutinosyloxy)-5-pentacosanolide (*Aust. J. Chem.* 1972, *25*, 1543); isolation and structure of a new anthraquinone glycoside - nodososide - from flowers (*Planta Med.* 1971, *19*, 222; *ibid.* 1973, *23*, 115); rhein isolated from leaves (*Curr. Sci.* 1979, *48*, 15).
Distribution : Naturally occurs in the eastern Himalayas, planted in gardens and avenues in other parts of India.

NEW COMPOUNDS



Nodososide



Azralidoside

BIOLOGICAL ACTIVITY

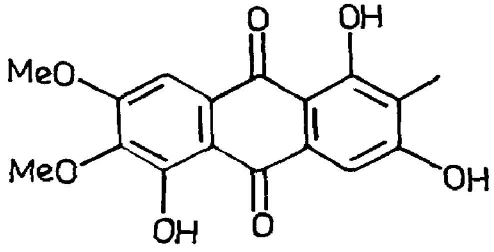
Rhein was responsible for purgative activity (*Curr. Sci.* 1979, *48*, 15).

C. obtusifolia L. syn. *C. tora* auct. (non L.) p.p. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 82).

Pharmacognostic studies of leaf, stem and root (*J. Res. Indian Med.* 1971, *6*, 270).

Detection of palmitic (11.0), stearic (9.5) and linoleic acids (49.1%) in oil by reversed phase PC (*Indian J. Appl. Chem.* 1972, *35*, 35; *Chem. Abstr.* 1973, *79*, 96832 c); a new anthraquinone pigment - 1,3,5-trihydroxy-6,7-dimethoxy-2-methylanthraquinone, mp. 210° (I) - and leucopelargonidin-3-O-α-L-rhamnopyranoside, mp. 202° (II) along with β-sitosterol isolated from roots (*Planta Med.* 1972, *21*, 393); a new naphtho-α-pyrone - toralactone - isolated from seeds (*Yakugaku Zasshi* 1973, *93*, 261; *Chem. Abstr.* 1973, *78*, 156649 q); rubrofusarin-6-β-gentiobioside and a new anthraquinone glycoside - 8-hydroxy-3-methylanthraquinone-1-β-gentiobioside (III) - along with chrysophanol, physcion, emodin and rubrofusarin isolated from seeds (*Indian J. Chem.* 1974, *12*, 1251); chrysophanic acid-9-anthrone, mp. 200°, isolated from seeds (*Sci. Cult.* 1974, *40*, 316); emodin isolated from leaves (*Indian J. Pharm.* 1977, *39*, 116); triacontan-1-ol, stigmasterol, β-sitosterol-β-D-glucoside, friedelin, palmitic, stearic, succinic and d-tartaric acids, uridine, myo-inositol, d-ononitol, kaempferol, quercetin, juglanin, astragalin, quercitrin and isoquercitrin isolated from leaves (*Yakugaku Zasshi* 1978, *98*, 1288; *Chem. Abstr.* 1978, *89*, 193900 n); quantitative estimation of total anthraquinone (0.85-1.25%) in seeds (*Shoyakugaku Zasshi* 1979, *33*, 72; *Chem. Abstr.* 1979, *91*, 189795 f).

NEW COMPOUNDS



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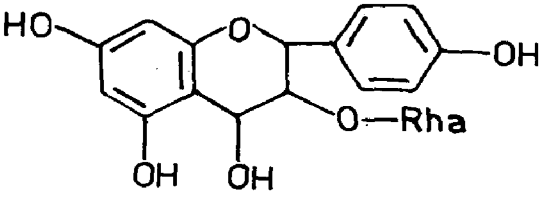

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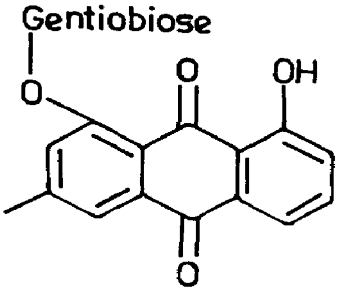

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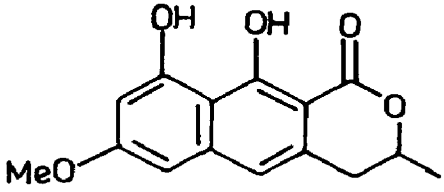


Toralactone

BIOLOGICAL ACTIVITY

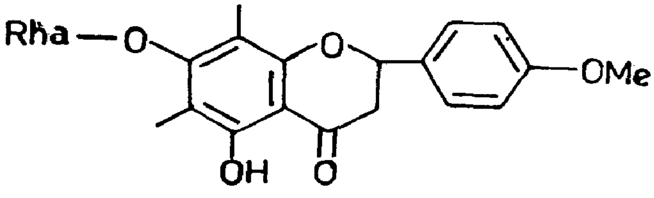
Chrysophanic acid-9-anthrone showed fungicidal activity (*Sci. Cult.* 1974, *40*, 316).

C. occidentalis L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 83).

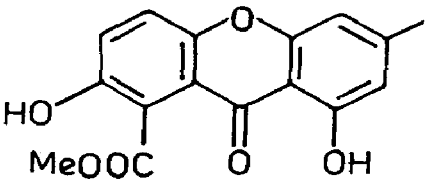
Seeds are used for winter cough, as a cure for convulsions in children and as an excellent diuretic (*Experientia* 1973, *29*, 141).

A new xanthone - cassiollin - along with emodin, physcion, chrysophanol, α_3-sitosterol, mp. 162°, and two unidentified pigments, mp. 214° and 243° isolated from acid hydrolysed extract (*J. Chem. Soc.* C 1970, 1285); N-methylmorpholine isolated from seeds (*J. Agric. Food Chem.* 1971, *19*, 198; *Chem. Abstr.* 1971, *74*, 50512 s); a phytosterolin (equal mixture of campesterol and β-sitosterol) isolated from seeds (*Phytochemistry* 1971, *10*, 670); a water-soluble polysaccharide composed of D-galactose and D-mannose in molar ratio of 1:3:1 isolated from seeds (*Indian J. Chem.* 1973, *11*, 505); physcion-β-D-glucopyranoside isolated from flowers and seeds (*Planta Med.* 1973, *23*, 298; *Experientia* 1973, *29*, 141); physcion, emodin, β-sitosterol and a phytosterol isolated from flowers and roots (*Planta Med.* 1973, *23*, 298; *Phytochemistry* 1973, *12*, 1186); 1,4,5-trihydroxyanthraquinone derivatives - islandicin, helminthosporin and xanthorin - isolated (*Indian J. Chem.* 1974, *12*, 1042); structure of cassiollin revised to 8-carbomethoxy-1,7-dihydroxy-3-methylxanthone and found identical with that of pinselin (*Indian J. Chem.* 1974, *12*, 1042, 1045); two new anthraquinones - 1,8-dihydroxy-2-methylanthraquinone (I), mp. 307°, and 1,4,5-trihydroxy-7-methoxy-3-methylanthraquinone (II) - isolated from seeds (*Experientia* 1974, *30*, 850); isolation and structure determination of matteucinol-7-rhamnoside and jaceidin-7-rhamnoside from leaves (*Phytochemistry* 1977, *16*, 1107); chrysophanol and a bianthraquinone (III) isolated from leaves (*Planta Med.* 1977, *32*, 375); quantitative analysis of total anthraquinones (0.85-1.25%) in seeds (*Shoyakugaku Zasshi* 1979, *33*, 72; *Chem. Abstr.* 1979, *91*, 189795 f).

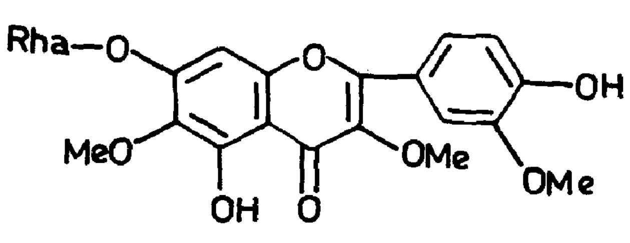
NEW COMPOUNDS



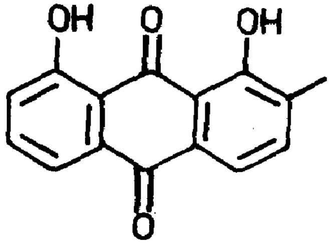
Matteucinol-7-rhamnoside



Cassiollin



Jaceidin-7-rhamnoside



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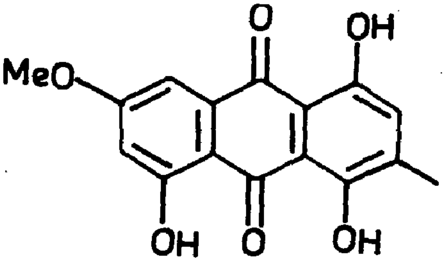

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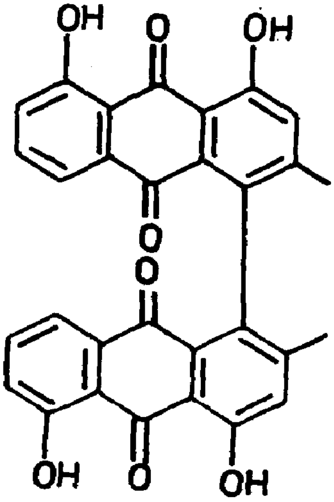


III

C. renigera Wall. ex Benth.

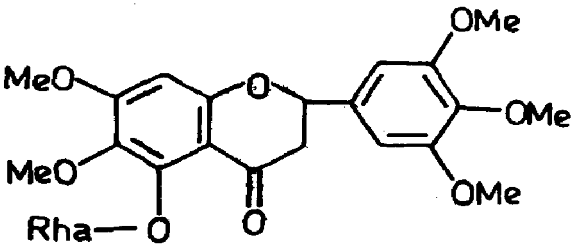
Eng. - Burmese pink cassia.

Seed proteins markedly lowered blood and liver cholesterol levels in rats (*Indian J. Pharmacol.* 1976, *8*, 149).

A new flavanone glycoside - 3′,4′,5′,6,7-pentamethoxyflavanone-5-O-α-L-rhamnopyranoside (I) - along with quercetagetin-3,6-dimethyl ether and an anthraquinone glycoside isolated from stem bark (*Phytochemistry* 1977, *16*, 798); a new flavanone glycoside - 5-hydroxy-4′-methoxyflavanone-7-α-L-rhamnopyranoside (II) - and a new anthraquinone - 1-hydroxy-3,8-dimethoxy-2-methylanthraquinone (III) - isolated from stem bark and characterised (*Planta Med.* 1977, *32*, 371); two new anthraquinone pigments - 1,8-dihydroxy-3, 5,7-trimethoxy-2-methylanthraquinone (IV) and 1,5,8-trihydroxy-6,7-dimethoxy-2-methylanthraquinone-3-O-α-L-rhamnopyranoside (V) - along with 1-hydroxy-8-methoxy-2-methylanthraquinone-3-O-α-L-rhamnopyranoside isolated from seeds (*Planta Med.* 1979, *36*, 91).

Distribution : Native of Burma, grown in gardens and along roadsides.

NEW COMPOUDNS



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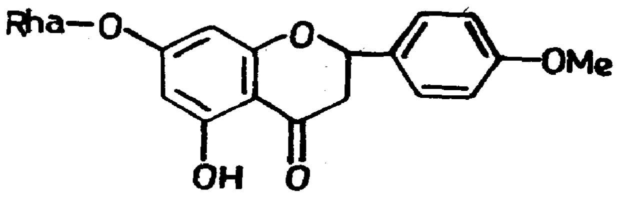

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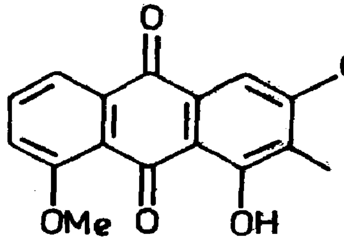

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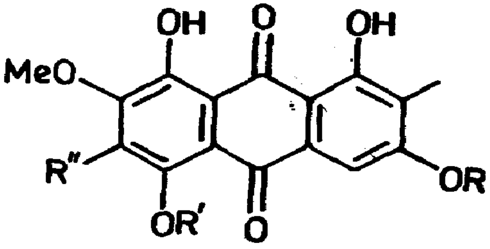


IV

R,R′ = Me, R″ = H

V

R = Rha, R′ = H, R″ = OMe

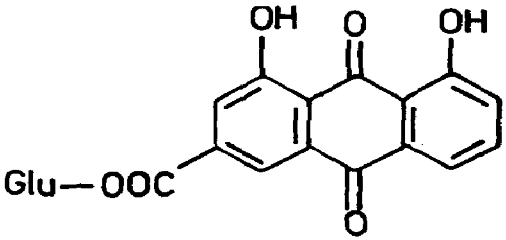
C. roxburghii DC. syn. *C. marginata* Roxb.

Blood and liver cholesterol levels in young rats markedly lowered by seed proteins (*Indian J. Pharmacol.* 1976, *8*, 149).

A new anthraquinone - 1,8-dihydroxy-3-carbo-(β-D-glucopyranosyloxy) anthraquinone (I) - isolated along with sitosterol, its glucoside, kaempferol, its 3-O-glucoside, quercetin, its 3-O-glucoside and 3-O-galactoside from flowers; structure (I) confirmed by synthesis (*Indian J. Chem.* 1978, *16*B, 437).

Distribution : Western region of peninsular India.

NEW COMPOUNDS



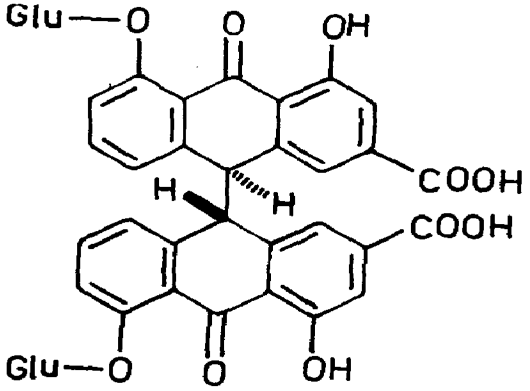
I

C. senna L. var. *senna* syn. *C. angustifolia* Vahl (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 83).

Chrysophanol, physcion, aloe-emodin, rhein and rheum-emodin isolated from callus

culture of cotyledons (*Phytochemistry* 1973, *12*, 1459); sennosides A,B,C and D, chrysophanol, emodin and physcion isolated (*Rev. Peru. Bioquim.* 1977, *1*, 31; *Chem. Abstr.* 1978, *88*, 101586 t); chrysophanol, physcion, rhein, emodin and aloe-emodin isolated from tissue culture of plant; all these compounds except physcion also present in glycosidic forms (*J. Pharm. Pharmacol.* 1974, *26*, 722); method for separation and purification of sennosides A,B and C as their calcium salts (Jpn. 7712,916 (1977) Jan. 31; *Chem. Abstr.* 1977, *87*, 11610 w; Jpn. 7754,012 (1977) May 2; *Chem. Abstr.* 1977, *87*, 122793 c); sennoside A_1 isolated from pods characterised as (-)sennidin- 8,8'-diglucoside (*Arzneim. Forsch.* 1978, *28*, 225).

NEW COMPOUNDS



Sennoside A1

BIOLOGICAL ACTIVITY

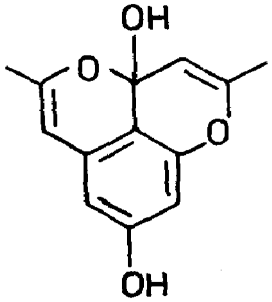
Calcium sennoside A and calcium sennoside B mixture in the dose range 50-800 μg/ml, produced dose-dependent contraction of rat colon which was blocked by piperazine citrate but not by atropine (*Bull. Haffkine Inst.* 1976, *4*, 105; *Chem. Abstr.* 1977, *86*, 150332 z).

C. siamea Lamk. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 83).

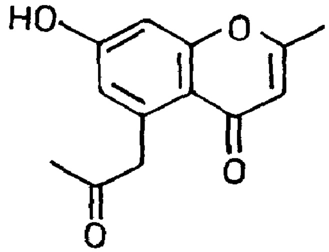
In addition to cassiamin A, two new pigments - cassiamin B and cassiamin C - isolated from bark of root and trunk and shown to be symmetrical dimers of emodin and chrysophanol respectively (*Indian J. Chem.* 1970, *8*, 109); isolation and structure elucidation of a dioxaphenaline derivative - barakol - from leaves (*J. Chem. Soc.* C 1970, 1686; *Curr. Sci.* 1978, *47*, 621); a new isoquinoline derivative - siamin - isolated and its structure confirmed by synthesis (*Tetrahedron Lett.* 1976, 821; *Arch. Pharm.* 1978, *311*, 569; *Chem. Abstr.* 1979, *90*, 83580 w); a polysaccharide isolated from seed mucilage composed of D-galactose and D-mannose in ratio of 1:1.5 (*Sci. Cult.* 1977, *43*, 316); D-pinitol, β-sitosterol, lupeol, sucrose, glucose, fructose, traces of arabinose, oligosaccharide A (glucose, arabinose, xylose and glucuronic acid), oligosaccharide B (glucose and arabinose), two phenolic compounds, mp. 205° and 207° and a flavone glucoside, mp. 212°, isolated from flowers; β-sitosterol, lupeol, oleanolic acid and sucrose from trunk bark (*J. Indian Chem. Soc.* 1977, *54*, 548; *Indian J. Pharm.* 1978, *40*, 15); chrysophanol, rhein, and chrysophanol-anthrone isolated from leaves

and bark; physcion and chrysophanol-dianthrone only from bark (*Curr. Sci.* 1977, *46*, 814; *Planta Med* 1978, *33*, 258); a wax, β-sitosterol, apigenin and kaempferol isolated from leaves (*Curr. Sci.* 1978, *47*, 621); anhydrobarakol and cassiachromone (5-acetonyl-7-hydroxy-2-methylchromone) isolated from leaves and seeds (*Arch. Pharm.* 1978, *311*, 569; *Chem. Abstr.* 1979, *90*, 83580 w); cassiamin A, p-coumaric acid, apigenin-7-O-galactoside, β-sitosterol and cassiachromone isolated from leaves and characterised (*Planta Med.* 1978, *33*, 258).

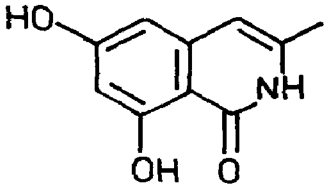
NEW COMPOUNDS



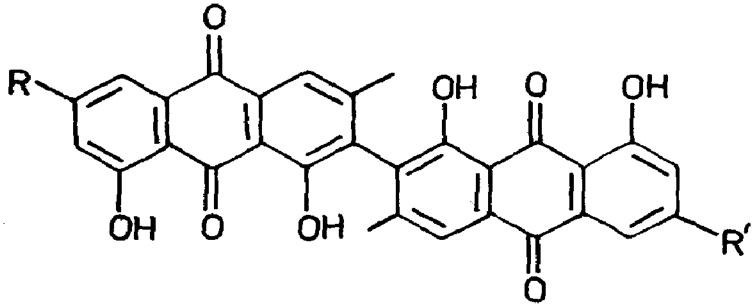
Barakol



Cassiachromone



Siamin



Cassiamin B
R,R′ = OH
Cassiamin C
R,R′ = H

C. sophera L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 55).

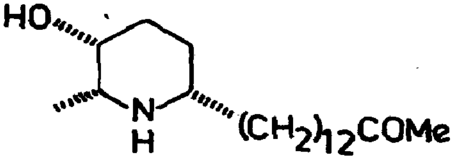
Rhamnetin-3-O-β-D-glucoside isolated along with chrysophanol from flowers (*Planta Med.* 1975, *28*, 182).

C. spectabilis DC.

A new alkaloid - cassinicine (2-dodecylacetyl-5-hydroxy-6-methylpiperidine) - along with β-sitosterol, stigmasterol, physcion and 1,3,8-trihydroxy-2-methylpiperidine isolated (*Planta Med.* 1977, *32*, 357).

Distribution : Native of tropical America, introduced into India in gardens as ornamental.

NEW COMPOUDNS



Cassinicine

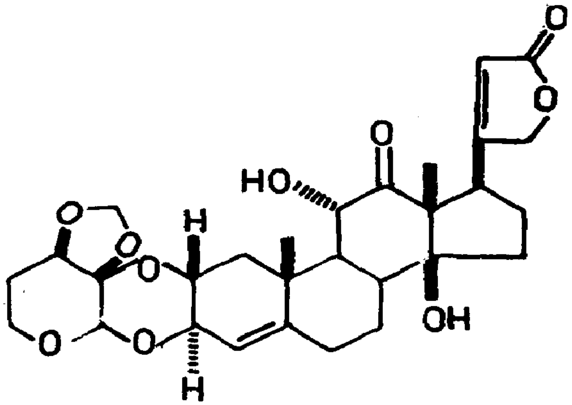
C. tora L.; see *C. obtusifolia* L.

CASSINE (Celastraceae)

C. glauca (Rottb.) Kuntze. syn. *Elaeodendron glaucum* (Rottb.) Pers. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 105).

Isolation and structure of a new cytotoxic cardiac glycoside - elaeodendroside A - from seeds (*Chem. Commun.* 1977, 255).

NEW COMPOUNDS



Elaeodendroside A

CASSYTHA (Cassythaceae)

C. americana Meissn.; see *C. filiformis* L.

C. filiformis L. syn. *C. americana* Meissn. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 84).

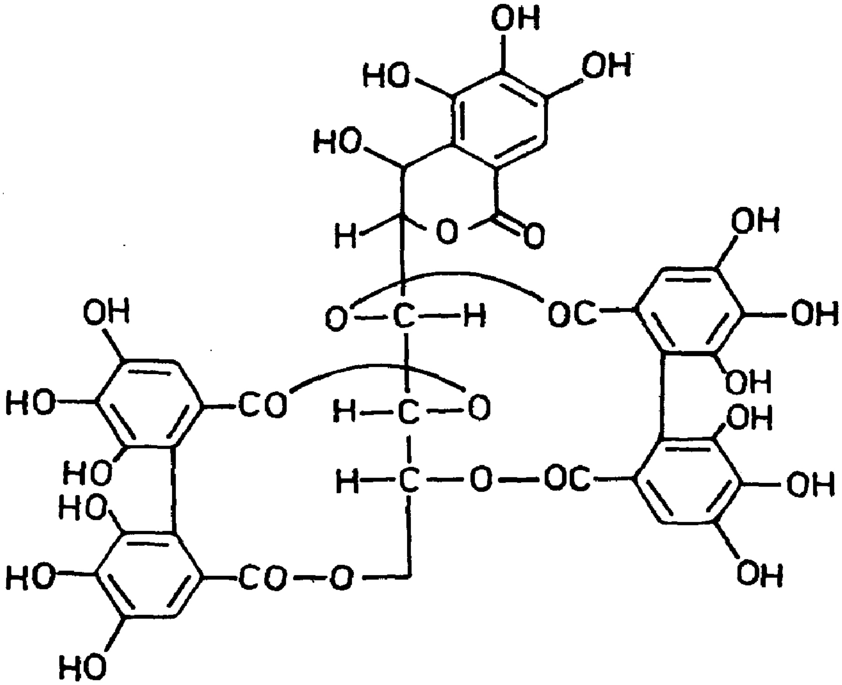
Isolation of an alkaloid - nantenine - and its synthesis (*Indian J. Chem.* 1973, *11*, 342).

CASTANEA (Fagaceae)

C. sativa Mill. syn. *C. vulgaris* Lam. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 85).

A tanning compound - vescalagin - isolated from wood and characterised (*Ann. Chem.* 1971, *751*, 60); waxes, ursolic acid, lupeol, betulin and fatty acids found in leaves (*Phytochemistry* 1972, *11*, 2733); asparagine, glutamic acid, alanine and γ-aminobutyric acid

from fruits (*Bull. Soc. Pharm. Bord.* 1977, *116*, 65; *Chem. Abstr.* 1978, *88*, 101601 u); myricetol, quercitol, rutoside, myricitroside, quercitroside and one unidentified phenolic compound isolated from leaves (*Plant Med. Phytother.* 1978, *12*, 31; *Chem. Abstr.* 1978, *89*, 176398 n).
NEW COMPOUNDS



Vescalagin

C. vulgaris Lam.; see *C. sativa* Mill.

CASTANOPSIS (Fagaceae)

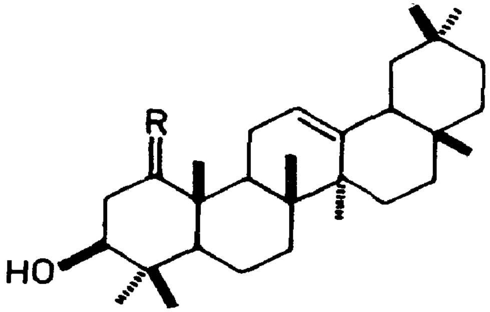
C. indica (Roxb.) DC.

Khasi - Dieng-saraing; Nep. - Bank-katus; Assam - Serang.

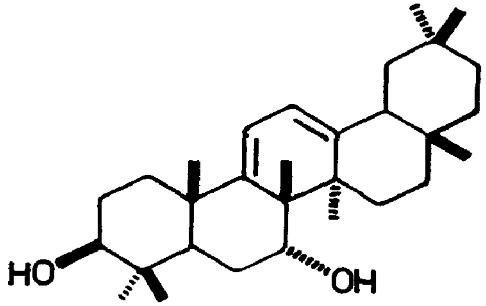
Two new triterpenoids - castanopsone and castanopsol - isolated and their structures and stereochemistry determined (*Phytochemistry* 1977, *16*, 1787); isolation and structure elucidation of a new triterpene - castanopsin (*Phytochemistry* 1978, *17*, 575).

Distribution : Himalayas from Nepal eastwards, alt. 300-1200 m, Assam and Khasi Hills, ascending to 1200 m.

NEW COMPOUNDS



Castanopsone
R = O
Castanopsol
R = α-OH,H



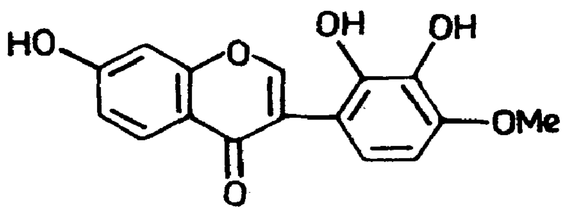
Castanopsin

CASTANOSPERMUM (Papilionaceae)

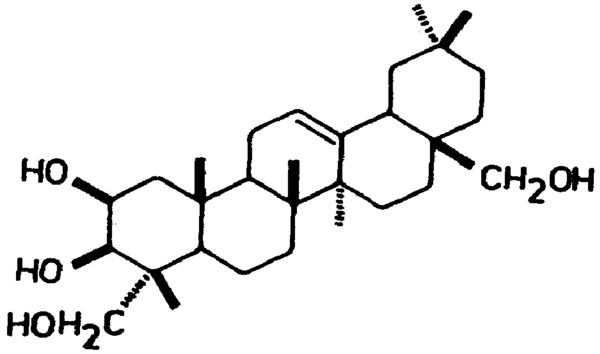
C. australe A. Cunn. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 87).

A new triterpene sapogenin - castanogenol - along with bayogenin isolated from bark (*Indian J. Chem.* 1969, *7*, 1203); 2β,3β-dihydroxyolean-12-en-28-oic acid and 3β-hydroxyolean-12-en-23,28-dioic acid isolated from wood; identity of former established by stereospecific synthesis (*Aust. J. Chem.* 1973, *21*, 629); koparin isolated from wood and characterised as 7,2′,3-trihydroxy-4′-methoxyisoflavone (*Aust. J. Chem.* 1977, *30*, 1827).

NEW COMPOUNDS



Koparin



Castanogenol

CASUARINA (Casuarinaceae)

C. equisetifolia L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 55).

A kaempferol glucoside, mp. 176°, isolated from leaves (*J. Indian Chem. Soc.* 1970, *47*, 179); kaempferol and quercetin glycosides from leaves (*Z. Naturforsch.* 1977, *32C*, 444; *Chem. Abstr.*

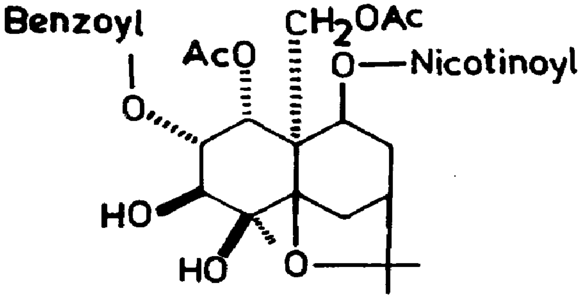
1977, *87*, 65344 f); shikimic and quinic acids, glucose, fructose, sucrose and amino acids isolated from bark, beans and wood (*Leather Sci.* 1978, *25*, 369; *Chem. Abstr.* 1979, *90*, 200335 h); (-)epicatechol, (-)epigallocatechol, gallic acid, protocatechuic acid, methyl gallate, (+)catechol and (+)gallocatechol isolated from bark (*Leather Sci.* 1979, *26*, 196; *Chem. Abstr.* 1979, *91*, 154296 s).

CATHA (Celastraceae)

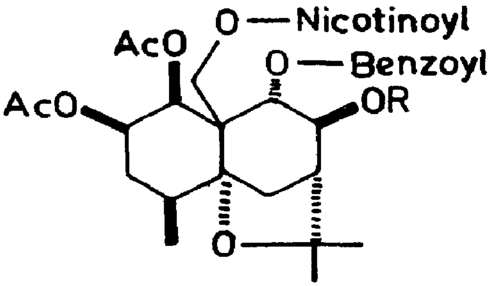
C. edulis Forsk. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 87).

Cathidine A,B,C and D isolated and structure of cathidine D determined (*Tetrahedron* 1975, *31*, 2727); new sesquiterpene alkaloids - cathedulin-2 and cathedulin-8 - isolated and characterised (*Chem. Commun.* 1976, 465); (S)(-)α-aminopropiophenone (I), (+)norpseudoephedrine and (-)norephedrine isolated (*Experientia* 1979, *35*, 572).

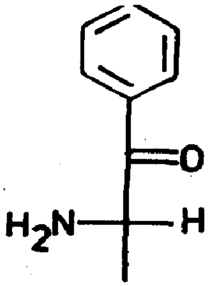
NEW COMPOUNDS



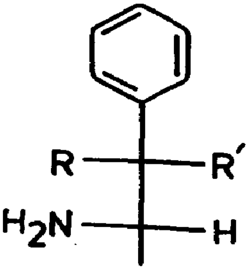
Cathidine D



Cathedulin-2
R = Nicotinoyl
Cathedulin-8
R = OH



I



(+)Norpseudoephedrine
R = H, R′ = OH
(-)Norephedrine
R = OH, R′ = H

CATHARANTHUS (Apocynaceae)

C. pusillus (Murr.) G. Don syn. *Vinca pusilla* Murr., *Lochnera pusilla* (Murr.) K. Schum. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 87).

Ursolic acid and leurosine isolated (*Lloydia* 1970, *33*, 261); a new base A, mp. 269°, along with rauwolscine, vindoline and demethoxyvindoline isolated from aerial parts; base A has yohimbinoid structure (*Indian J. Chem.* 1973, *11*, 7); lochnericine isolated from roots; vindorosine and venoterpene from leaves (*Indian J. Chem.* 1979, *17B*, 175).

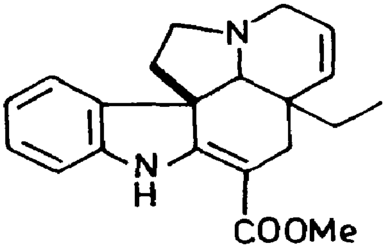
C. roseus (L.) G. Don syn. *Vinca rosea* L., *Lochnera rosea* (L.) Reichb.(*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 87).

Total alkaloid and chloroform - soluble fractions exhibited hypotensive action both in normal and hypertensive dogs and antagonised acetylcholine-induced contraction of skeletal muscle (*J. Shivaji Univ.* 1971, *4*, 121; *Chem. Abstr.* 1972, *77*, 160150 s); these fractions also showed sedative, hypnotic and mild analgesic effects and increased hexobarbitone sleep time. Both antagonised experimental convulsion in rats in doses near LD50 (*J. Shivaji Univ.* 1971, *4*, 129; *Chem. Abstr.* 1972, *77*, 160151 t); plant extract after i.p. administration into mice with 4 day-old Ehrlich ascites was effective in stopping tumor cells in metaphase. The percentage of tumor cells arrested in metaphase increased with increasing concentration of vincristine sulphate (0.01-10.0 μg) in plant extract (*Planta Med.* 1979, *36*, 87).

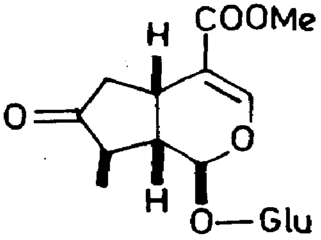
Tabersonine isolated from mature seeds (*Acta Chim.* 1971, *69*, 241; *Chem. Abstr.* 1971, *75*, 115855 y); deoxyloganin, loganin, sweroside and a new monoterpene glucoside - dehydrologanin - isolated (*Indian J. Chem.* 1972, *10*, 454); a review of chemistry and pharmacology of vinblastine, vincristine, leurosine and leurosidine (*Planta Med.* 1972, *22*, 324); L(+)bornesitol isolated from root (*Phytochemistry* 1973, *12*, 1177); isolation and absolute configuration of vincarodine (*Helv. Chim. Acta* 1973, *56*, 2660; *Heterocycles* 1974, *2*, 73; *J. Org. Chem.* 1974, 39,431); absolute configuration of vindolinine (*Tetrahedron Lett.* 1974, 3699); isolation and structure elucidation of vincoline (*J. Pharm. Sci.* 1974, *63*, 536); structure of roseoside assigned (*Phytochemistry* 1974, *13*, 2541); isolation and structure of a new minor alkaloid - desacetoxyvinblastine (*Experientia* 1975, *31*, 18); isolation of new dimeric alkaloids - leurocolombine, vinamidine and pseudovincaleukoblastinediol - and elucidation of their structures (*J. Pharm. Sci.* 1975, *64*, 1953); revised structure of vinamidine (*Tetrahedron* 1978, *34*, 677); structure of vincathicine (*J. Org. Chem.* 1976, *41*, 1001); isolation and crystal structure of vincubine (*Rev. Cubana Farm.* 1976, *10*, 19; *Chem. Abstr.* 1977, *86*, 167891 d); alkaloid B, vincamajine and aquamycin isolated (*Farmatsiya* 1976, *25*, 30; *Chem. Abstr.* 1976, *85*; 106639 k); venalstonine along with ajmalicine, vindolinine, perivine, lochnericine, catharanthine, vindoline, leurosine, tetrahydroalstonine and an unidentified alkaloid isolated from roots (*Rev. Cubana Farm.* 1976, *10*, 3; *Chem. Abstr.* 1977, *86*, 185876 g; *Rev. Cubana Farm.* 1978, *12*, 185; *Chem. Abstr.* 1979, *90*, 109846 q); a spectrophotometric method for estimation of ajmalicine in roots and stems (*Indian J. Pharm.* 1977, *39*, 62); method for separation of leurosine and vinblastine and their acid addition salts from crude alkaloidal mixture (Ger. 2,648,284 (1977) June 2; *Chem. Abstr.* 1977, *87*, 90720 h; US 806,317 (1977) June

13; *Chem. Abstr.* 1978, *89*, 43906 e); synthesis of leurosine (*Tetrahedron Lett.* 1976, 3945); synthesis of vindoline (*J. Am. Chem. Soc.* 1978, *100*, 4220); synthesis of vinblastine, vincristine and vinrosidine (leurosidine) (*Tetrahedron Lett.* 1976, 1099; Ger. 2,614,863 (1977) Oct. 13; *Chem. Abstr.* 1978, *88*, 7180 j; US 806,317 (1977) June 13; *Chem. Abstr.* 1978, *89*, 43906 e; *C. R. Hebd. Seances Acad. Sci.* Ser. C 1979, *288*, 129; *Chem. Abstr.* 1979, *91*, 5402 w; *J. Am. Chem. Soc.* 1979, *101*, 2243).

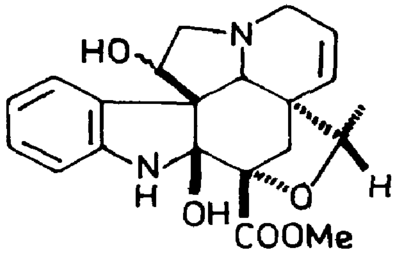
NEW COMPOUNDS



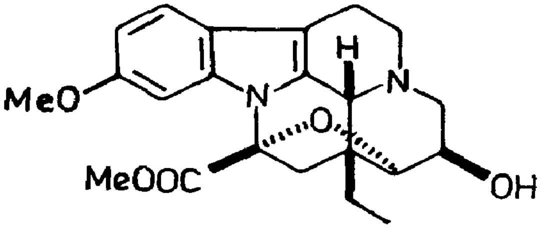
Tabersonine



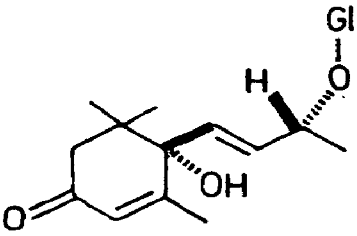
Dehydrologanin



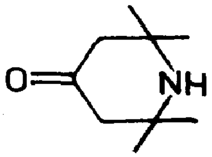
Vincoline



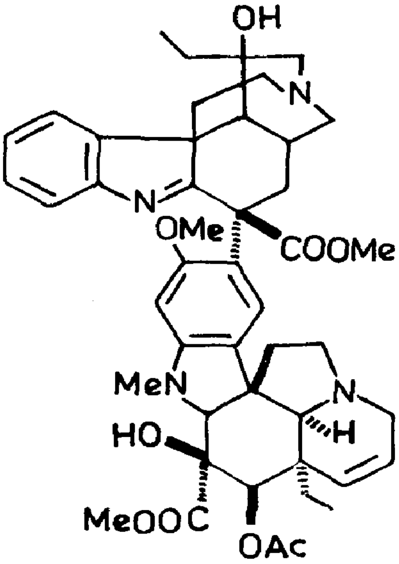
Vincarodine



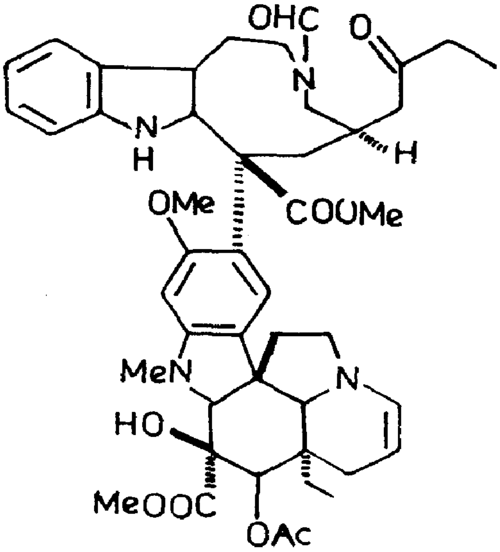
Roseoside



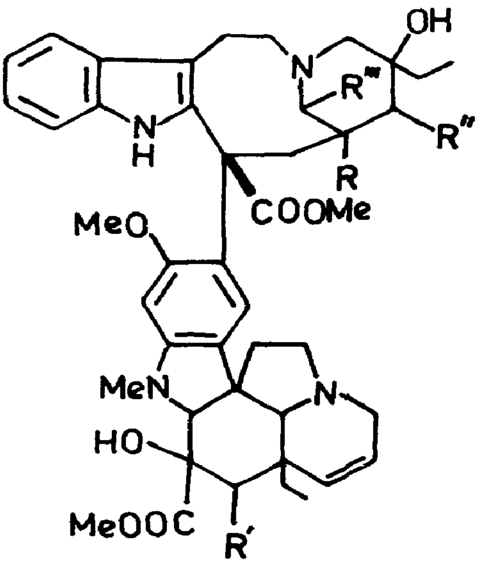
Vincubine

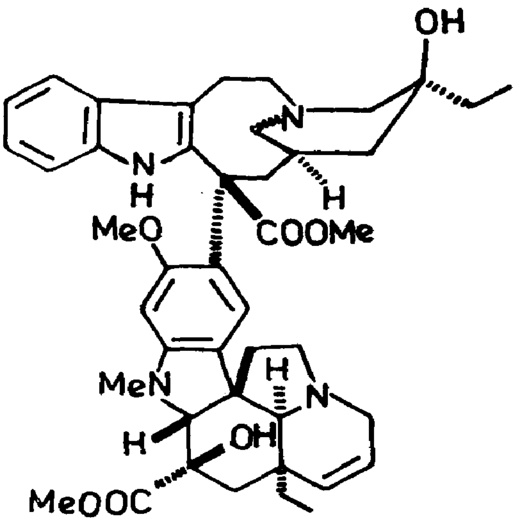


Vincathicine



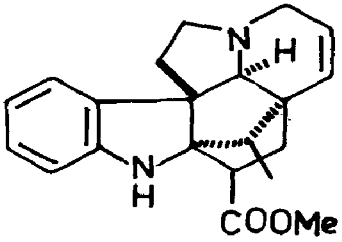
Vinamidine



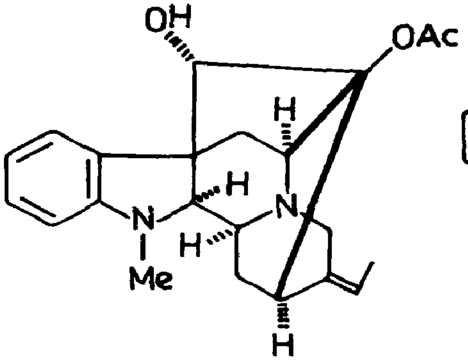


Desacetoxyvinblastine

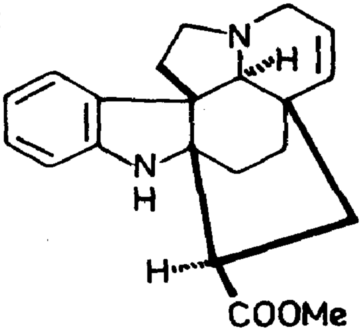
Leurocolombine
R = OH, R′ = OAc, R″,R‴ = H
Pseudovincaleukoblastinediol
R,R′ = H, R″ (or R‴) = OH, R‴(or R″) = H



Vindolinine



Vincamajine



Venalstonine

BIOLOGICAL ACTIVITY

Vinblastine (0.1-1.0 mM) inhibited the transport of amine granules in monoamine-containing neurons of rats possibly by disrupting their microtubules. It caused marked monoamine accumulation in bulbospinal noradrenaline and serotonin neurons (*Acta Neuropathol. Suppl.* 1970, *5*, 226; *Chem. Abstr.* 1974, *80*, 78515 t); vinblastine stimulated isolated frog heart and rabbit intestine but had no effect on blood pressure whereas total alkaloid fraction showed hypotensive activity in normal and hypertensive dogs; vinblastine antagonised acetylcholine-induced contraction of skeletal muscle (*J. Shivaji Univ.* 1971, *4*, 121; *Chem. Abstr.* 1972, *77*, 160150 s); vinblastine sulfate (3.0-3.6 mg/kg, i.v.) did not alter acetylcholine content of heart, salivary gland, superior cervical ganglion and adrenal gland of rats, when administered in doses which deplete norepinephrine in heart and salivary gland. Vincristine (0.6 mg/kg, i.v.)

did not decrease acetylcholine or norepinephrine in heart and salivary gland (*Neuropharmacology* 1973, *12*, 233; *Chem. Abstr.* 1973, *78*, 154843 z); vinblastine (3 mg/kg) caused 70% reduction in positive inotropic effect of noradrenergic nerve stimulation after thirty hours treatment and although there was a marked reduction in the force of contraction of left atrium, its sensitivity to noradrenaline (NA) was increased 12-fold. Vincristine (3 mg/kg) caused 65% reduction in the effect of noradrenergic nerve stimulation and 42-fold increase in sensitivity to NA (*Brit. J. Pharmacol.* 1975, *53*, 444); vinblastine (3 mg/kg) given i.v. 60 hr before DMPP (dimethylphenylpiperazinium iodide) administration, decreased pressor responses of latter in intact rats. Pressor responses at doses of 30,60 and 120 μg DMPP/kg, i.v. were reduced by 32, 65 and 45% respectively (*Rev. Cienc. Farm.* 1976, 21; *Chem. Abstr.* 1978, *89*, 17082 p); vincristine sulfate at 0.2-2 μg/ml inhibited contractile response to nerve stimulation in isolated rat vagus nerve stomach preparation (*Boll. Soc. Ital. Biol. Sper.* 1976, *52*, 806; *Chem. Abstr.* 1977, *86*, 183023 c).

Single or weekly i.v. administration of vinblastine (0.1-0.5 mg/kg) increased platelet count in rats. Thrombocytosis was preceded by increase in megakaryocytes in bone marrow. Thus vinblastine may stimulate thrombocytopoiesis rather than release reserve platelets or cause compensatory hyperregeneration in rats (*Haemostasis* 1972, *1*, 73; *Chem. Abstr.* 1974, *80*, 182 n); vinblastine (0.1 mg/kg/day for 7 days) produced leukopenia and agranulocytosis in rats but did not affect erythropoiesis (*J. Shivaji Univ.* 1972, *5*, 5; *Chem. Abstr.* 1974, *80*, 128183 f); vinblastine (0.2 mg/100 g, i.v.) significantly increased the number of circulating megakaryocytes in inferior vena cava in female rats (*Scand. J. Haematol.* 1972, *9*, 613; *Chem. Abstr.* 1973, *78*, 67048 a); vinblastine (0.15-2.0 mg/kg, i.p.) decreased total number of nucleated cells per femur and increased the concentration of fibroblast colonies in monolayer cultures of guinea pig bone marrow (*Byull. Eksp. Biol. Med.* 1972, *74*, 95; *Chem. Abstr.* 1973, *78*, 255 x); vinblastine (2-3 mg/kg, i.p.) increased number and radiosensitivity of colony-forming units (CFU) in the spleen of mice, with maximum number of CFU appearing 4 days postinjection. Its administration 2 days before γ-irradiation increased the survival of mice but administration 4 days before irradiation had no effect (*Radiobiologiya* 1972, *12*, 659; *Chem. Abstr.* 1973, *78*, 24185 a); a single dose of vincristine (0.83-1 mg/kg, s.c.) in guinea pigs increased (18 hr) and then decreased blood leukocyte level, decreased thrombocyte and reticulocyte levels but did not affect erythrocytes. It decreased number of bone marrow myelokaryocytes and converted marrow reticular cells into megaloblasts within 12-18 hours. It apparently blocked mitosis in marrow cells at metaphase (*Vop. Radiobiol. Biol. Deistviya Tsitostaticheskikh Prep.* 1971, *3*, 245; *Chem. Abstr.* 1974, *80*, 141143 n); vinblastine produced a small decrease in leucocyte count (32.08±0.22) at a dose of 0.2 mg/kg for 6 to 12 weeks in rats. Vinblastine (0.4 mg/kg and 0.8 mg/kg) and vincristine (0.8 mg/kg) caused a decrease in platelet count (*Indian J. Physiol. Pharmacol.* 1973, *17*, 105); vinblastine (0.00001 M) *in vitro* inhibited function of blood platelets indicating that over- dose could cause serious blood disorders (*Neoplasma* 1978, *25*, 625; *Chem. Abstr.* 1979, *90*, 132648 k).

Pretreatment of mice with three 0.005 mg doses of vinblastine significantly enhanced growth of transplanted sarcomas due to its immunosuppressive effect on the animals. In contrast,

pretreatment with 0.02 mg doses inhibited tumor growth; it had no effect on growth of tumors when administered to animals already bearing palpable tumors (*Neoplasma* 1973, *20*, 239; *Chem. Abstr.* 1973, *79*, 100529 d); vinblastine (1-4 mg/kg, i.v.) injected into mice with Ehrlich ascites carcinoma showed 25-35% inhibition. The combined inhibitory effect of vinblastine and bruneomycin varied between 35 to 60% whereas the combined toxicity increased only slightly (*Antibiotiki* 1973, *18*, 633; *Chem. Abstr.* 1973, *79*, 111694 e); formulation of vinblastine and vincristine for topical, oral and i.v. administration to psoriatic patients (US 3,749,784 (1973) July 13; *Chem. Abstr.* 1973, *79*, 129100 t); vinblastine and leurosine are useful cytostatic agents in treating malignancies (Ger. 2,648,248 (1977) June 2; *Chem. Abstr.* 1977, *87*, 90720 h).

Vincristine (1 mg/kg) given to mice with skin carcinoma induced by 20-methylcholanthrene, caused very early ultrastructural changes in interphase cells probably by inhibiting protein synthesis and affecting membrane synthesis (*Advan. Antimicrob. Antineoplastic Chemother. Proc. Int. Congr. Chemother.* 7th 1971, *2*, 157; *Chem. Abstr.* 1973, *79*, 38638 h); vincristine sulphate (0.2-3.2 mg/kg, i.p.) slightly decreased thrombocyte count in mice on day one post-administration which then increased to a maximum on day five. Degree of thrombocytosis decreased with increase in dose. At 0.4 mg/kg, it enhanced *in vivo* incorporation of methionine into thrombocytes (*Kiserl. Orvostud.* 1973, *25*, 366; *Chem. Abstr.* 1974, *80*, 66709 w); vincristine (0.1 μg) when injected intc mice 5 days after transplantation of L1210 ascites cells did not synchronise cell division of tumor nor did it synchronise mitosis of jejunal cryptepithelia of normal mouse. Theoretical model demonstrated that synchronisation could not be expected (*Chemother. Proc. Int. Congr. Chemother.* 9th 1976, *8*, 31; *Chem. Abstr.* 1977, *86*, 183182 d); vincristine, an *in vivo* synchronising agent, administered (0.1 μg, i.p.) to mice 5 days after inoculation with L1210 ascites tumor cells increased percentage of arrested mitosis. All cells entering mitosis within 4 hr were arrested, from 4-12 hr mitotic index decreased and from 12-48 hr remained within normal range. Apparently this drug did not synchronise *in vivo* cell division of L1210 ascites tumor (*Pulse-cytophotom. Int. Symp.* 2nd, 1976, 260; *Chem. Abstr.* 1977, *87*, 62668 d); *in vitro* studies on HeLa cells showed that vincristine sulphate affected not only mitotic but also interphase cells. Vincristine-affected cells first continued their passage through cell cycle undisturbed but after reaching mitosis they were arrested in metaphase. *In vivo* studies on jejunal cryptepithelium of normal mouse double- labelled with 3H and 14C-thymidine to produce narrow subpopulation of crypt cells showed that effect of vincristine sulphate was the same as *in vitro* system (*Cell Tissue Kinet.* 1977, *10*, 147; *Chem. Abstr.* 1977, *87*, 78394 x); vincristine inhibited formation of ribosome RNA precursor in nucleoli of glioblastoma and meningioma isolated from human brain, indicating that its antitumor activity was attributable to inhibition of ribosomal RNA formation (*Juzen Igakkai Zasshi* 1978, *87*, 619; *Chem. Abstr.* 1979, *91*, 13596 c); intratesticular injection of vinblastine sulphate and vincristine sulphate in rats arrested mitotic and meiotic division to metaphase followed by cell death which was more rapid in case of vincristine sulphate. Both had a slightly damaging effect on pachytene spermatocytes. Vincristine sulphate specifically damaged acrosomic system and

cytoplasmic bridges of young spermatids (*Exp. Pathol.* 1978, *15*, 85; *Chem. Abstr.* 1978, *89*, 84659 v).

Vinblastine sulphate (0.02 mM) increased glucagon release from isolated guinea pig islets of Langerhans whether the basal release was stimulated by arginine (5mM) or inhibited by octanoic acid (5 mM) (FEBS 1973, 30, 89; *Chem. Abstr.* 1973, *79*, 181 r); vinblastine sulphate *in vitro* potentiated the secretagogue effect of dibutyryl cyclic AMP on pancreatic acinar cells but failed to affect the spontaneous release of enzyme. Potentiation was energy dependent and was more in calcium-containing medium than in absence of calcium. Damaging effect of vinblastine on acinar cells was ruled out (*Biochem. Biophys. Res. Commun.* 1977, *76*, 217; *Chem. Abstr.* 1977, *87*, 78311 t); vinblastine did not affect secretion of enzymes from rat pancreas, but potentiated secretory response to dibutyryl cyclic AMP (*Experientia* 1977, *33*, 1066); vinblastine in vitro prevented assembly of tubulin in rat brain extracts. Addition of vinblastine to assembled microtubules resulted in their rapid depolymerisation (*Acta Biochem. Biophys. Acad Sci. Hung.* 1977, *12*, 259; *Chem. Abstr.* 1978, *88*, 15811 f); there was reduction of the total (40%) and the acute phase (43%) areas of insulin secretion induced by 5 g i.v. glucose load and the rate of glucose utilisation was reduced by 25% in human neoplastic patients after 60 minutes of receiving i.v. injection of therapeutic dose of vincristine for cancer chemotheraphy. No differences were observed after 5.0g i.v. glucose loads given at hourly intervals to non-neoplastic patients (*Experientia* 1977, *33*, 970).

Chronic *in vitro* application of vinblastine sulphate (0.1%) at 28° was shown to depolarise muscle fibres in adult rats (*Pharmacol. Res. Commun.* 1977, *9*, 223; *Chem. Abstr.* 1977, *86*, 182985 f); skeletal muscle on exposure to vincristine (1.2 mM) for 1 day, showed spheromembranous degeneration. At lower concentration (0.01, 0.1 mM) for 3 days, muscle fibres showed less severe degeneration and contained many crystalline inclusions in sarcoplasm (*Exp. Neurol.* 1977, *55*, 112; *Chem. Abstr.* 1977, *87*, 95479 w); administration of vinblastine sulphate (10 mg/kg, i.v.) to rats decreased plasma Ca^{2+} to 4.2 mg/100 ml and increased parathyroid hormone (PTH) from 80 to 257 pg/ml (*Endocrinology* 1977, *101*, 1192); vinblastine sulphate produced marked alteration in motility of gastro-intestinal tract in rats. It caused dose-dependent reduction in rate of gastric emptying and slowed transit of test substance through small intestine (*Arch. Int. Pharmacodyn. Ther.* 1976, *239*, 331; *Chem. Abstr.* 1979, *91*, 204380 n).

Effect of vinblastine on *in vitro* utilization of D-glucose and its subsequent conversion to lactate by small intestine of rats studied. Vinblastine treatment (1.0 mg/kg) continued four hourly for 8 to 12 hr decreased significantly rate of glucose uptake from medium but rate of lactate production was not appreciably affected. This was significantly depressed on prolongation of vinblastine treatment for 16 to 18 hr thereby suggesting that alkaloid administration for longer duration influences greatly the normal metabolic pattern of enterocytes (*Indian J. Med. Res.* 1979, *70*, 669).

Vincristine administered i.p. at maximally tolerated dose (1.5 mg/kg) caused immediate and prolonged inhibition of thymidine, uridine and L-leucine uptake into respective spermatogenic cells and affected all types of spermatogenic cells with the exception of mature

spermatozoa and significantly decreased fertility. It also decreased fertility *in vitro* of spermatogonia, spermatocyte and spermatid stages (*J. Pharmacol. Exp. Ther.* 1972, *181*, 192); vinblastine (0.5-4 μg/g) injected s.c. in mice 48 hour after immunisation with sheep erythrocytes, completely inhibited immune response (*Tsitologiya* 1977, *19*, 186; *Chem. Abstr.* 1977, *86*, 183202 k).

Akuammidine (100 mg/kg, s.c.) increased bloodsugar level in rats, but when given at dose of 40 mg/kg/day for 4 days it significantly decreased blood sugar (*Farmakol. Alkaloidov Serdechnykh Glikozidov* 1971, 17; *Chem. Abstr.* 1973, *78*, 119186 r); akuammidine (130 mg/kg) affected motor defence reflexes and skeletal muscle tone as shown by 80% rats failing the rotarod test (*Farmakol. Alkaloidov Serdechnykh Glikozidov* 1971, 30; *Chem. Abstr.* 1973, *78*, 66912 r).

Yohimbine (1 mg/kg) blocked hypotensive and respiratory actions of clonidine (5 mg/kg) in chloralosed rats but did not block or reduce clonidine-induced increase in flexor reflex activity. High dose of yohimbine (20 mg/kg) increased brain noradrenaline (NA) turnover whereas low dose (5 mg/kg) selectively increased cortical NA turnover (*Eur. J. Pharmacol.* 1974, *28*, 89); yohimbine (0.2 mg/kg, i.v.) produced significant atony in rumen and reticulum of sheep whereas 0.1 mg/kg had little or no effect (*Arg. Esc. Vet. Univ. Fed. Minas Gerais* 1978, *30*, 11; *Chem. Abstr.* 1978, *89*, 191030 e).

CEDRELA (Meliaceae)

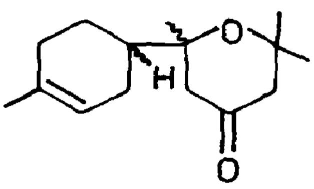
C. toona Roxb. ex Rottl. & Willd.; see *Toona ciliata* M. Roem.

CEDRUS (Pinaceae)

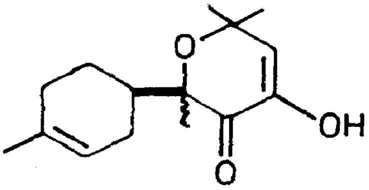
C. deodara (Roxb. ex D. Don) G. Don syn. *C. libani* Barrel var. *deodara* (Roxb. ex D. Don) Hook.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 93).

Stem bark extract showed significant anti-inflammatory activity in rat (*Indian J. Pharmacol.* 1973, *5*, 334).

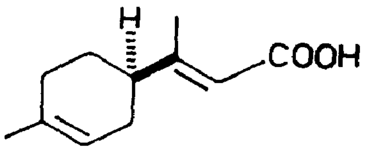
Deodarone isolated from essential oil (*Tetrahedron Lett.* 1973, 427); centdarol isolated and characterised as 2β,7β-dihydroxy- himachal-3-ene (*Phytochemistry* 1975, *14*, 2237); isolation and structure of isocentdarol (*Phytochemistry* 1976, *15*, 557); structure determination of oxidohimachalene isolated from essential oil (*Tetrahedron* 1977, *30*, 1207); structure of isohimachalone, isolated from wood essential oil (*Tetradedron* 1977, *33*, 885); structures of deodardione and limonenecarboxylic acid (I) isolated from wood (*Tetrahedron* 1978, *34*, 599).
NEW COMPOUNDS



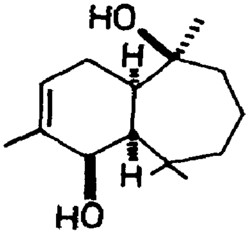
Deodarone



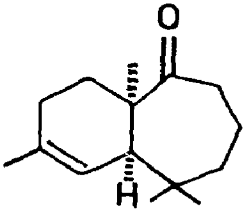
Deodardione



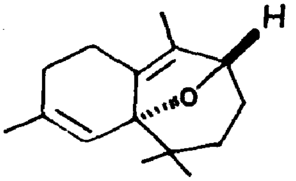
I



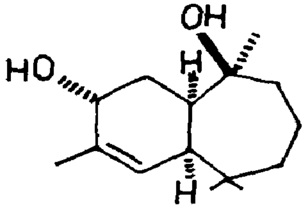
Centdarol



Isohimachalone



Oxidohimachalene



Isocentdarol

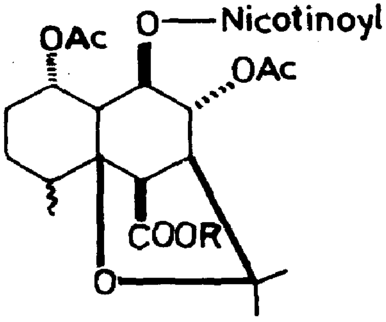
C. libani Barrel var. *deodara* (Roxb. ex D. Don) Hook.f.; see *C. deodara* (Roxb. ex D. Don) G. Don

CELASTRUS (Celastraceae)

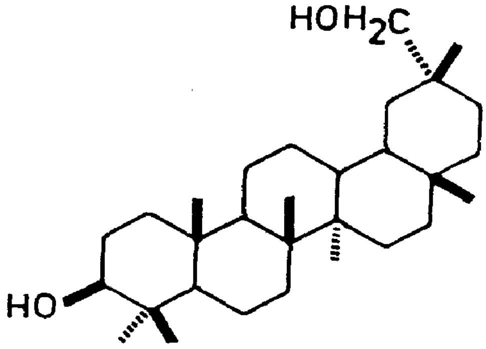
C. paniculatus Willd. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 56).

Isolation and crystal structure of malkanguniol (*Tetrahedron Lett.* 1973, 845; *J. Oil Technol. Assoc.* India 1975, 7, 51; *Chem. Abstr.* 1976, *84*, 56501 r; *Tetrahedron Lett.* 1978, 3243); isolation and structure elucidation of a new sesquiterpene ester - malkangunin - and of two new sesquiterpenoid tetra esters - celapanine and celapanigine (*Tetrahedron Lett.* 1974, 213); a new triterpene diol - paniculatadiol - isolated along with β-amyrin, β-sitosterol and fatty acids from seed oil (*J. Oil Technol. Assoc.* India 1975, *7*, 51; *Chem. Abstr.* 1976, *84*, 56501 r; *J. Oil Technol. Assoc.* India 1977, *9*, 1; *Chem. Abstr.* 1978, *88*, 23192 v); extraction method of active polyester principle from seed oil (*J. Oil Technol. Assoc.* India 1976, *8*, 129; *Chem. Abstr.* 1977, *86*, 152657 h).

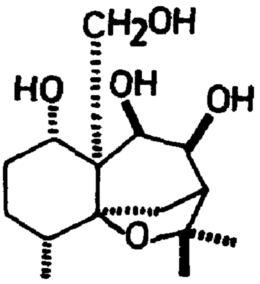
NEW COMPOUNDS



Celapanine
R = Furanoyl
Celapanigine
R = Benzoyl



Paniculatadiol



Malkanguniol

CELSIA (Scrophulariaceae)

C. coromandeliana Vahl; see *Verbascum chinensis* (L.) Sant.

CELTIS (Ulmaceae)

C. orientalis L.; see *Trema orientalis* (L.) Blume

CENTAUREA (Asteraceae)

C. calcitrapa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 95).

Oral administration of aqueous extract to mice at a dose corresponding to 20 g of plant/kg decreased blood sugar by 12-13 mg/100 ml, LD50 in mice was 4.1-14.6 g dry matter/kg (*Plant Med. Phytother.* 1979, *13*, 41; *Chem. Abstr.* 1979, *91*, 49568 j).

Polyphenols, sterols, amino acids and triterpenes from leaves, flowers and green branches (*Plant Med. Phytother.* 1979, *13*, 41; *Chem. Abstr.* 1979, *91*, 49568 j); two alkaloids, mp. 198° and 118°, β-amyrin and β-sitosterol isolated from Egyptian plant; lipid and carbohydrate contents of plant also studied (*Egypt. J. Pharm. Sci.* 1977, *16*, 429; *Chem. Abstr.* 1978, *89*, 126141 c); a bitter germacranolide - cnicin - isolated from leaves (*Egypt. J. Pharm. Sci.* 1977, *16*, 445; *Chem. Abstr.* 1978, *89*, 160096 b).

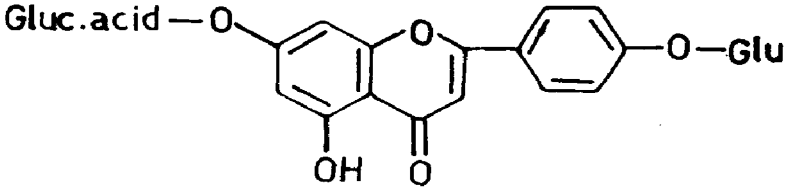
BIOLOGICAL ACTIVITY

Cnicin showed hypoglycaemic activity and also antibiotic activity against *Brucella abortus*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* (*Egypt. J. Pharm. Sci.* 1977, *16*, 445; *Chem. Abstr.* 1978, *89*, 160096 b).

C. cyanus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 95).

Apigenin-4′-O-β-D-glucoside-7-O-β-D-glucuronide (I) isolated (*Phytochemistry* 1974, *13*, 1219).

NEW COMPOUNDS



I

C. depressa M. Bieb. (*Compend. Indian Med. Plants*, Vol. I, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 95).

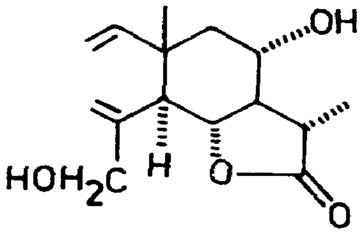
Scutellarein-7-β-D-glucuronoside, scutellarein-5β-D-glucuronoside, quercimeritrin, apigenin and scutellarein isolated from flowers (*Khim. Prir. Soedin.* 1969, *5*, 324; *Chem. Abstr.* 1970, *72*, 39768 t).

C. melitensis L.

A new sesquiterpene lactone - melitensin - isolated and its structure elucidated (*An. Quim.* 1971, *67*, 1243; *Chem. Abstr.* 1972, *77*, 34722 s; *ibid.* 1974, *70*, 158; *Chem. Abstr.* 1974, *81*, 78104 d); β-hydroxyisobutyrates of melitensin and 11(13)-dehydromelitensin isolated (*Phytochemistry* 1975, *14*, 2039).

Distribution : The Nilgiris, alt. 1800-2100 m.

NEW COMPONDS



Melitensin

C. picris Pall.; see *Acroptilon repens* (L.) DC.

CENTELLA (Apiaceae)

C. asiatica (L.) Urban syn. *Hydrocotyle asiatica* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi 1990, p. 96).

Plant tablets administered orally to mentally retarded children for 12 weeks showed very significant increase in both general ability and behavioural pattern (*J. Res. Indian Med.* 1973, *8*, 9).

A new triterpene acid - madasiatic acid - isolated and characterised as 2α,3β,6β-trihydroxyurs-12-en-oic acid (*Bull. Soc. Chim. Fr.* 1969, 3592); polyacetylenes (I,II,III, IV and V) and nine other acetylenes isolated from subterranean parts (*Arch. Pharm.* 1973, *306*, 197; *Chem. Abstr.* 1973, *78*, 156633 e).

NEW COMPOUNDS

$Me(CH_2)_4CH=CHCH_2(C\equiv C)_2CH\equiv CH=CH_2OAc$

Polyacetylene I

$Me(CH_2)_4CH=CH\text{-}CH(OAc)(C\equiv C)_2CH(OAc)CH=CH_2$

Polyacetylene II

$Me(CH_2)_4CH=CHCH(OAc)(C\equiv C)_2CH(OH)CH\equiv CH_2$

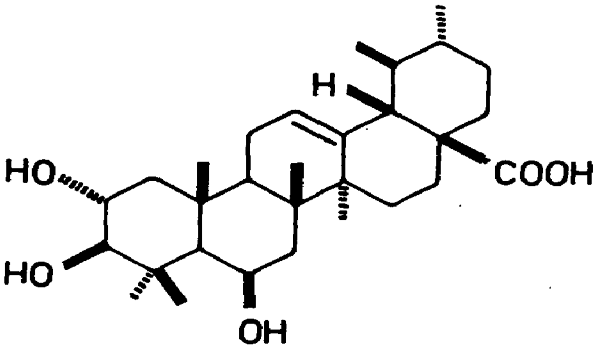
Polyacetylene III

$Me(CH_2)_4CH(OAc)CH=CH(C\equiv C)_2CH(OH)CH=CH_2$

Polyacetylene IV

$Me(CH_2)_4CH(OH)CH=CH(C\equiv C)_2CH(OH)CH=CH_2$

Polyacetylene V



Madasiatic acid

BIOLOGICAL ACTIVITY

Saponins exhibited sedative action in mice and rats (*J. Res. Indian Med.* 1970, *4*, 160); asiaticoside (1.25 mg/100g/day for 3 days,s.c.) prevented development of cold-induced gastric ulcers in rats (*C.R. Acad. Sci.* Şer D 1974, *278*, 1743; *Chem. Abstr.* 1974, *81*, 21124 f).

CENTIPEDA (Asteraceae)

C. minima (L.) A. Br. & Aschers. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 58).

Taraxasteryl palmitate, taraxasteryl acetate, taraxasterol, stigmasterol and arnidiol isolated from herb (*Yakugaku Zasshi* 1970, *90*, 846; *Chem. Abstr.* 1970, *73*, 106344 n); lupeol and its acetate, hexacosanol and stigmasterol isolated (*J. Indian Chem. Soc.* 1970, *47*, 96).

CENTRATHERUM (Asteraceae)

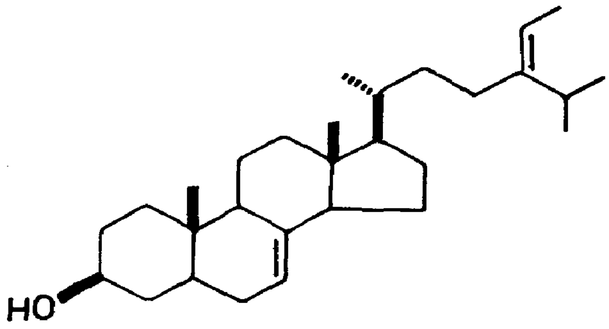
C. anthelminticum (L.) Kuntze syn. *Vernonia anthelmintica* Willd. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 58).

Alcoholic extract showed anthelmintic activity on earthworm and tapeworm. It caused relaxation of smooth muscle in isolated guinea pig ileum and had mild laxative action in rats

(*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 135).

7,(Z)24(28)-Stigmastadienol (I), stigmasterol, 5-stigmasten-3β-ol and 7,22-stigmastadienol isolated from seeds (*Rec. Trav. Chim.* 1970, *89*, 186; *Chem. Abstr.* 1970, *72*, 100984 d); 8,14,(Z)24(28)- stigmastatrienol acetate (II) isolated from seeds (*Rec. Trav. Chim* 1970, *89*, 1054; *Chem. Abstr.* 1971, *74*, 28864 m); a new elemanolide - vernodalol, mp. 133° - isolated from seeds (*Phytochemistry* 1977, *16*, 1838); amino acid composition of seeds determined (*J. Inst. Chemists*, Calcutta 1978, *50*, 190; *Chem. Abstr.* 1979, *91*, 16716 c).

NEW COMPOUNDS



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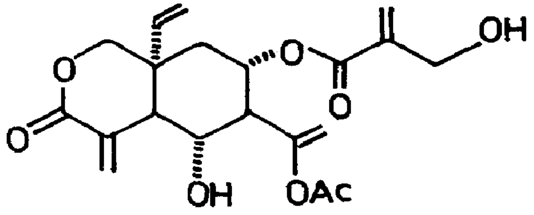
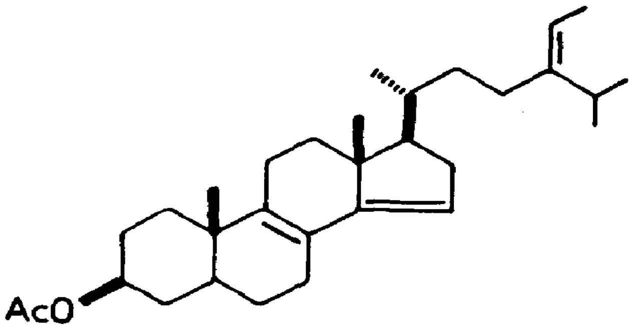


Vernodalol



II

CEPHALANDRA (Cucurbitaceae)

C. indica Naud.; see *Coccinia grandis* (L.) Voigt

CEPHAELIS (Rubiaceae)

C. ipecacuanha (Brot.) A. Rich. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 97).

Synthesis of protoemetine (*Acta Chim. Acad. Sci. Hung.* 1977, *95*, 81; *Chem. Abstr.* 1979, *90*, 39088 t).

BIOLOGICAL ACTIVITY

Emetine (1 mg/kg, s.c.) showed tubocurarine-like effect on neuromuscular transmission in rat (*J. Pharm. Pharmacol.* 1970, *22*, 69); metabolism of ascorbic acid in rats was affected by

s.c. injection of emetine HCl, concentration of ascorbic acid decreased in serum, liver and kidney but remained unaffected in adrenals (*Brit. J. Pharmacol.* 1972, *44*, 810).

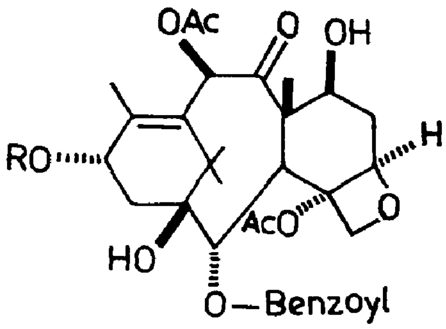
CEPHALOTAXUS (Cephalotaxaceae)

C. mannii Hook.f.

Isolation and structure of cephalomannine from stems and roots, isolation of taxol and baccatin (*Chem. Commun.* 1979, 102).

Distribution : Khasi Hills in Meghalaya.

NEW COMPOUNDS



Cephalomannine

R = CO(OH)CHPhCHNHOC(MeHC=)CMe

BIOLOGICAL ACTIVITY

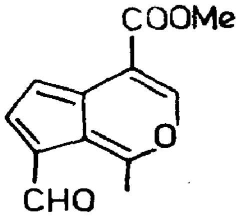
Cephalomannine showed potent anticancer activity in KB cell culture, LD50 = 0.038 μg/ml, and in lymphocytic leukaemia (P-388) in mice (*Chem. Commun.* 1979, 102).

CERBERA (Apocynaceae)

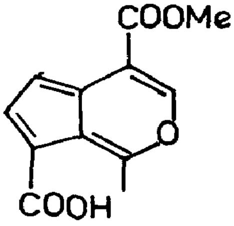
C. manghas L. syn. *C. odollam* Gaertn. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 59).

Thevetin B and monoacetylthevetin B, mp. 176°, isolated from seed kernels (*Indian J. Pharm.* 1974, *36*, 75); diacetylneriifolin isolated (*Phytochemistry* 1976, *15*, 848); succinic acid, nicotiflorin, rutin and L(+)bornesitol isolated from leaves (*Yakugaku Zasshi* 1976, *96*, 1046; *Chem. Abstr.* 1976, *85*, 139772 b); an iridoid - cerbinal - along with its 10-carboxy derivative (cerberic acid) and 11-carboxy derivative (cerberinic acid) isolated from bark (*Chem. Pharm. Bull.* 1977, *25*, 3422); digitoxigenin glycosides (neriifolin, cerberin, thevetin B and its 2′-O-acetyl derivative) and taughinigenin glycosides (deacetyl taughinin and its gentiobioside) identified in seeds; 17-β-H-taughinigenin-β-L-thevetoside and its (1′′→4′)-glucosyl derivative and deacetyltaughinin from root bark and stem; neriifoline, 17-βH-neriifolin, deacetyl-taughinin and 17-βH-deacetyltaughinin from leaves (*Chem. Pharm. Bull.* 1977, *25*, 2744).

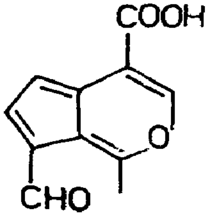
NEW COMPOUNDS



Cerbinal



Cerberic acid



Cerberinic acid

C. odollam Gaertn.; see *C. manghas* L.

CERIOPS (Rhizophoraceae)

C. roxburghiana Arn.

B. - Baragoran.

Two stereoisomers of procyanidins isolated from bark (*Indian J. Chem.* 1971, *9*, 928); β-amyrone, triacontanol, taraxerol, β-amyrin and β-sitosterol isolated (*J. Indian Chem. Soc.* 1976, *53*, 1241).

Distribution : Tidal forests of Sunderbans, east coast and Andamans.

CHAEROPHYLLUM (Apiaceae)

C. villosum Wall. ex DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 98).

Sitosterol isolated from aerial parts (*Indian J. Chem.* 1976, *14*B, 475).

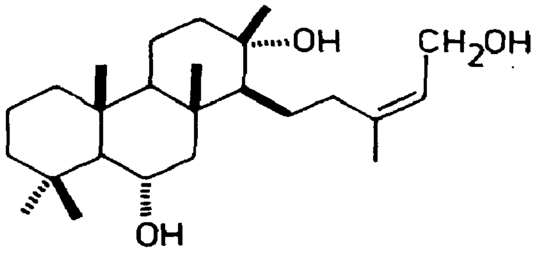
CHEILANTHES (Cheilanthaceae)

C. farinosa (Forsk.) Kaulf.

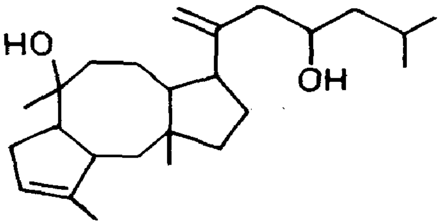
A new sesterterpene - cheilanthatriol - isolated and characterised (*Tetrahedron Lett.* 1971, 4443; *Bull. Soc. Chim. Fr.* 1976, 1879); another sesterterpene - cheilarinosin - isolated and its structure elucidated (*Indian J. Chem.* 1972, *10*, 482).

Distribution : Throughout India, ascending to 2400 m in hills.

NEW COMPOUNDS



Cheilanthatriol



Cheilarinosin

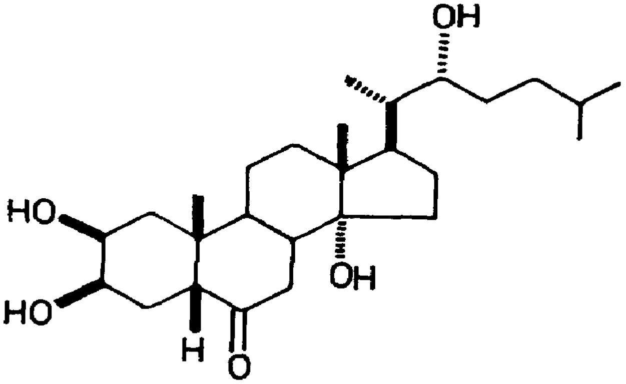
C. mysurensis Wall. ex Hook.; see *C. swartzii* Webb. & Benth.

C. swartzii Webb. & Benth. syn. *C. mysurensis* Wall. ex Hook.

Ecdysone analogue - cheilanthone B - isolated (*Indian J. Chem.* 1973, *11*, 1336).

Distribution : Orissa, Andhra Pradesh, Tamil Nadu, Karnataka and Kerala.

NEW COMPOUNDS

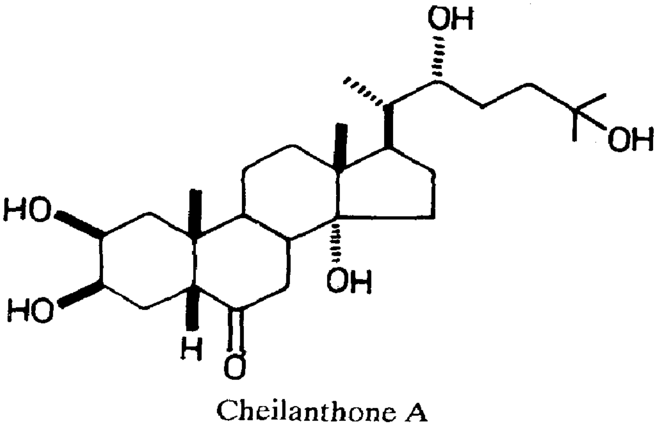


Cheilanthone B

C. tenuifolia (Burm.) Swartz (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 60).

Two ecdysone analogues - cheilanthone A, mp. 235°, and cheilanthone B, mp. 225°, - isolated and characterised as 7,8-dihydroecdysone and 25-deoxy-7,8-dihydroecdysone respectively (*Chem. Commun.* 1970, 243).

NEW COMPOUNDS



Cheilanthone A

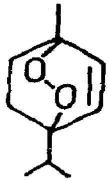
CHENOPODIUM (Chenopodiaceae)

C. ambrosioides L. (*Glossary Indian Med. Plants*, Chopra, Nayar, & Chopra, PID, New Delhi, 1956, p. 61).

Triterpene glycosides - chenopodosides A and B - isolated (*Khim. Prir. Soedin.* 1972, *8*, 395; *Chem. Abstr.* 1972, *77*, 162003 v); oil contained high content of ascaridole along with xylene

isomers, p-cymene, an alcohol and four carboxylic acids (*Indian Perfum.* 1975, *18*, 40; *Chem. Abstr.* 1977, *87*, 122623 x); essential oil contained major constituent (-)pinocarveol and (+)α-pinene and ascaridole (*Nippon Nogei Kagaku Kaishi* 1978, *52*, 149; *Chem. Abstr.* 1978, *89*, 30569 x).

NEW COMPOUNDS

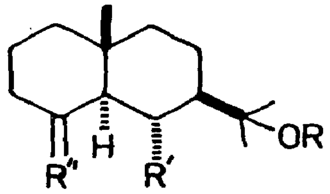


Ascaridole

C. botrys L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 61).

Twenty six compounds identified in essential oil by GLC and a new acid - chenopodic acid - isolated (*Izv. Acad. Nauk Turkm. SSR, Ser. Biol. Nauk* 1973, 88; *Chem. Abstr.* 1974, *80*, 96169 n); chrysoeriol, quercetin-3-O-β-D-glucopyranoside and quercetin-3-O-β-D-glucopyranosyl—6-β-D-glucopyranoside (*Khim. Prir. Soedin.* 1974, *10*, 403; *Chem. Abstr.* 1975, *82*, 13990 r); a new alkaloid mp. 145-7°, isolated from fruits (*Rastit. Resur.* 1978, *14*, 385; *Chem. Abstr.* 1978, *89*, 126150 e); 11-acetoxyselinan-4α-ol,α-chenopodiol, β-chenopodiol, botrydiol, α-chenopodiol monoacetate, α-, β- and γ-eudesmol acetates along with six known sesquiterpenes isolated and characterised (*An. Quim.* 1978, *74*, 91; *Chem. Abstr.* 1978, *89*, 197737 n); three new eudesmanes (I,II and III) isolated and characterised (*An. Quim.* 1978, *74*, 1575; *Chem. Abstr.* 1979, *91*, 57205 d).

NEW COMPOUNDS

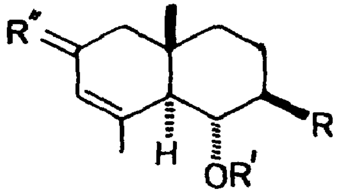


11-Acetoxyselinan-4α-ol

R = Ac, R' = H, R'' = α-OH, β-Me

β-Chenopodiol

R = H, R' = OH, R'' = CH_2

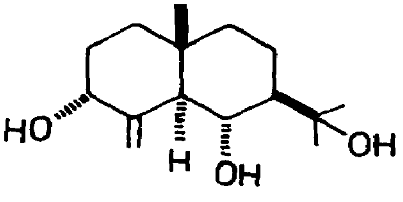


I

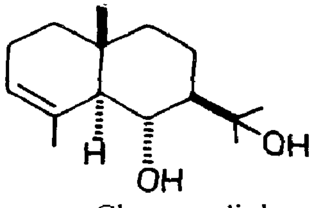
R = CMe=CH_2, R' = Ac, R'' = H,H

II

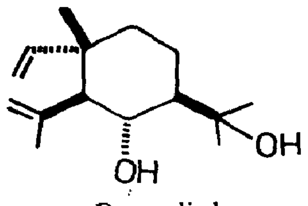
R = CMe_2OH, R' = H, R'' = O



III



α-Chenopodiol



Botrydiol

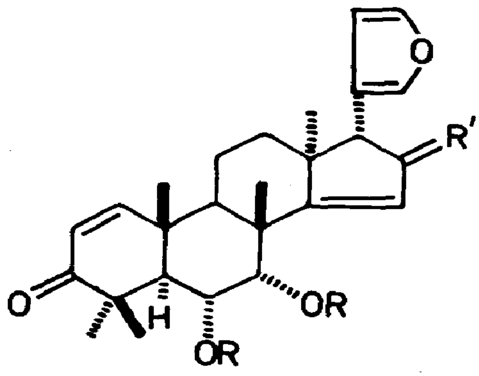
CHISOCHETON (Meliaceae)

C. cumingianus (C. DC.) Harms ssp. *balansae* (C. DC.) Mabberley syn. *C. paniculatus* (Roxb.) Hiern. (nom. illeg.).

Three new meliacins - 6α-acetoxyazadirone, 6α-acetoxy-16-oxoazadirone and 6α, 7α-dihydroxymeliaca-1,14,20,22-tetraene-3,10-dione (I) isolated from fruits and characterised (*Indian J. Chem.* 1978, *16*B, 1042).

Distribution : Assam, Khasi Hills and Sikkim; alt. 100-800 m.

NEW COMPOUNDS



6α-Acetoxyazadirone
R = Ac, R′ = H,H
6α-Acetoxy-16-oxoazadirone
R = Ac, R′ = O
I
R = H, R′ = O

C. paniculatus (Roxb.) Hiern; see *C. cumingianus* (C. DC.) Harms ssp. *balansae* (C. DC.) Mabberley

CHLORANTHUS (Chloranthaceae)

C. brachystachys Blume; see *Sarcandra glabra* (Thunb.) Nakai

C. glaber (Thunb.) Makino; see *Sarcandra glabra* (Thunb.) Nakai

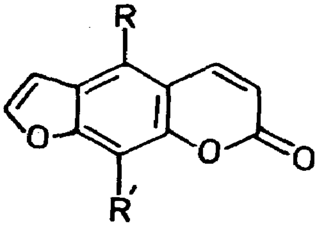
CHLOROXYLON (Rutaceae)

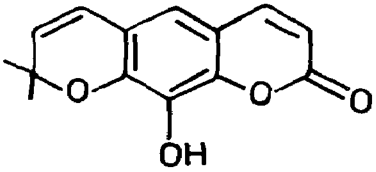
C. swietenia DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 99).

Rutamarin from bark (*Indian J. Chem.* 1972, *10,* 674); xanthoxyletin, luvangetin, 7-demethylsuberosin, aesculetin dimethylether, nodakanetin, γ-fagarine and skimmianine isolated (*Phytochemistry* 1972, *11*, 2647; *Indian J. Chem.* 1977, *15*B, 200); nine new coumarins - swietenone, swietenocoumarins A, B, C, D, E, F, 8-prenylnodakenetin and demethylluvangetin - and two new alkaloids - swietenidins A and B - isolated from bark and characterised;

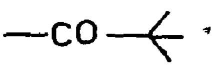
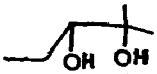
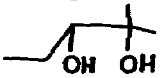
in addition, coumarins - xylotenin, rutamarin, chalepin, heliettin, suberosin , aesculetin dimethylether and isopimpinellin - and lignans - hinokinin, savinin, collinusin and syringaresinol - also isolated from bark (*Indian J. Chem.* 1977, *15*B, 440); two new compounds - 2,4-dihydroxy-5-prenylcinnamic acid (I) and swietenol - along with xanthyletin and alloxanthoxyletin isolated (*Indian J. Chem.* 1977, *15*B, 200).

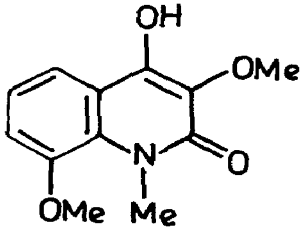
NEW COMPOUNDS



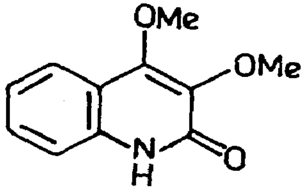


Demethylluvangetin

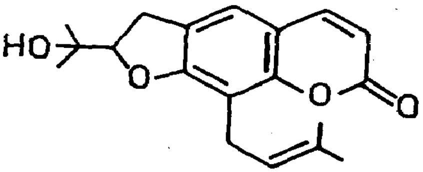
	R	R'
Swietenone		H
Swietenocoumarin A		H
Swietenocoumarin B		OMe
Swietenocoumarin C		H
Swietenocoumarin D		OMe
Swietenocoumarin E		H
Swietenocoumarin F		OMe



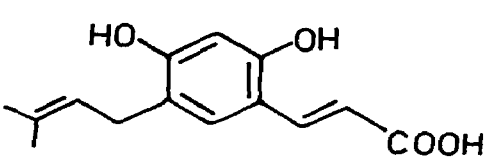
Swietenidin A



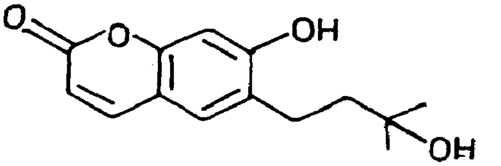
Swietenidin B



8-Prenylnodakenetin



I



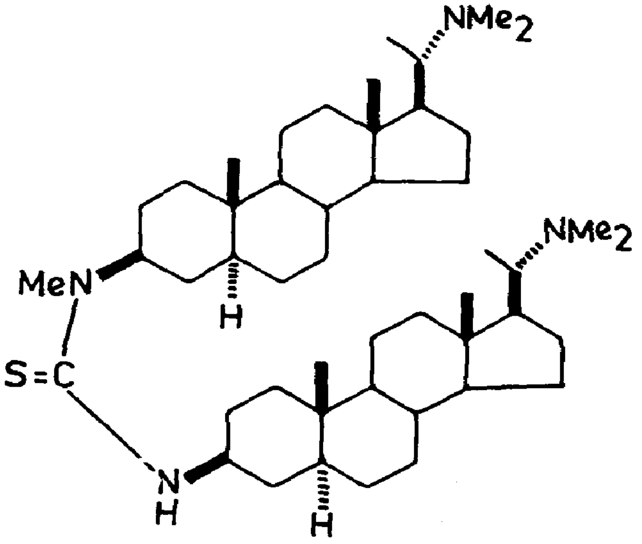
Swietenol

CHONEMORPHA (Apocynaceae)

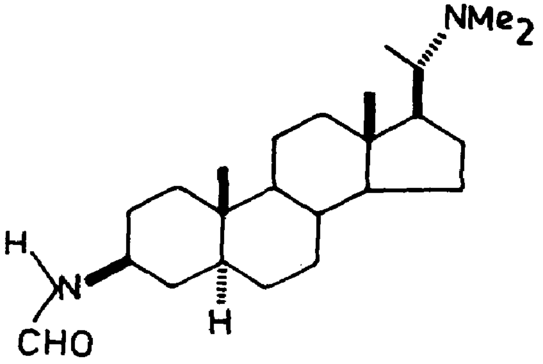
C. fragrans (Moon) Alston syn. *C. macrophylla* (Roxb.) G. Don (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 99).

Funtumafrine C, mp. 168°, from roots identical with deaminochonemorphinone (*Indian J. Chem.* 1972, *10*, 1197); two new steroid alkaloids - japindine and N-formylchonemorphine - isolated from root bark and characterised; their structures confirmed by synthesis (*Indian J. Chem.* 1973, *11*, 1056; *ibid.* 1978, *16*B, 346); bauerenol acetate and β-sitosterol from leaves (*Indian J. Chem.* 1978, *16*B, 346).

NEW COMPOUNDS



Japindine



N-Formylchonemorphine

C. macrophylla (Roxb.) G. Don; see *C. fragrans* (Moon) Alston

CHROMOLAENA (Asteraceae)

C. odorata (L.) King & Robinson; see *Eupatorium odoratum* L.

CHRYSANTHEMUM (Asteraceae)

C. cinerariaefolium (Trev.) Vis. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 100).

Apigenin, luteolin and apigenin-4′-glucuronide from flowers (*Curr. Sci.* 1973, *42*, 811).

BIOLOGICAL ACTIVITY

Apigenin-4′-glucuronide when tested against house flies synergised the action of pyrethrum extract appreciably although its insecticidal activity was poor (*Curr. Sci.* 1973, *42*, 811).

CHRYSOSPLENIUM (Saxifragaceae)

C. alternifolium L.

Penduletin, 3,7-di-O-methylquercetagetin, 3,6,7-tri-O-methylquercetagetin and 3,3′,6,7-tetra-O-methylquercetagetin from plant (*Phytochemistry* 1976, *15*, 517).

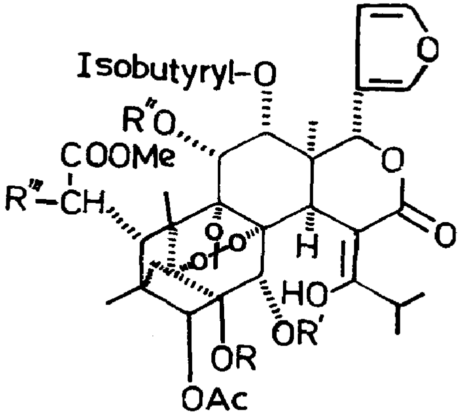
Distribution : Sikkim Himalayas, alt. 3600-4500 m.

CHUKRASIA (Meliaceae)

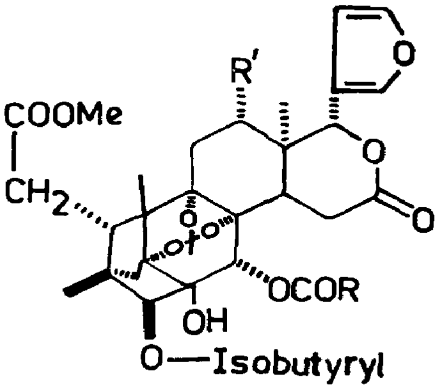
C. tabularis A. Juss. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 63).

Sitosterol, melianone, scopoletin and 6,7-dimethoxycoumarin isolated (*Phytochemistry* 1974, *13*, 2012); quercetin and its 3-galactoside and tannic acid from leaves (*J. Res. Indian Med.* 1975, *10*, 25); structures of bussein homologue and chukrasin, isolated from timber, and tabularin from bark elucidated (*J. Chem. Res.* (*S*), 1978, 20; *Chem. Abstr.* 1978, *88*, 191164 f); five new meliacins - chukrasins A,B,C,D and E - isolated from wood and characterised (*Helv. Chim. Acta* 1978, *61*, 1814); four new meliacin esters - 3,30-diisobutyrates and 3-isobutyrate-30-propionates of phragmalin and 12-acetoxyphragmalin - isolated from seeds and characterised (*J. Chem. Soc.* Perkin 1 1978, 285).

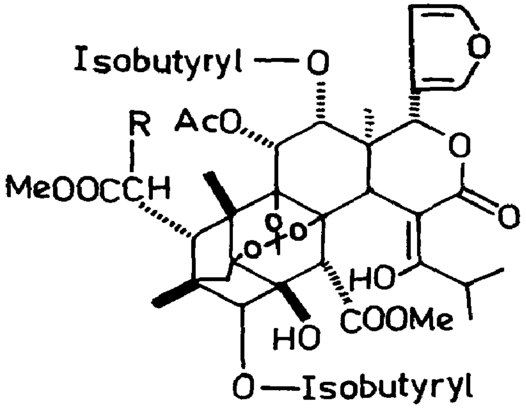
NEW COMPOUNDS



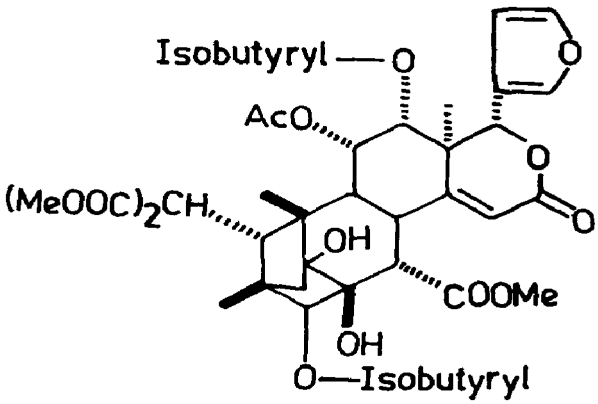
Chukrasin A
R = H, R‴ = OH,
R′/R″ = Ac/Isobutyryl
Chukrasin B
R,R‴ = H, R′,R″ = Isobutyryl
Chukrasin C
R,R‴ = H, R′/R″ = Ac/Isobutyryl
Chukrasin D
R = Ac, R′/R″ = Ac/Isobutyryl, R‴ = H
Chukrasin E
R = Ac, R′,R″ = Isobutyryl, R‴ = H



Phragmalin-3,30-diisobutyrate
R = $CHMe_2$, R′ = H
Phragmalin-3-isobutyrate-30-propionate
R = Et, R′ = H
12-Acetoxyphragmalin-3,30-diisobutyrate
R = $CHMe_2$, R′ = OAc
12-Acetoxyphragmalin-3-isobutyrate-30-propionate
R = Et, R′ = OAc



Bussein homologue
R = H
Chukrasin
R = OH



Tabularin

CICER (Papilionaceae)

C. arietinum L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 63).

Biochanin A content in plant 8.0 mg/kg; formononetin also detected (*Indian J. Anim. Sci.* 1975, *45*, 622; *Chem. Abstr.* 1977, *87*, 65305 u); vanillic and p-hydroxybenzoic acids from leaves (*Indian J. Exp. Biol.* 1978, *16*, 1213).

CICHORIUM (Asteraceae)

C. endivia L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 63).

D-(+)Dicaffeoyltartaric acid isolated (*Z. Naturforsch.* 1974, *29C*, 360; *Chem. Abstr.* 1974, *81*, 101830 y); kaempferol-3-β-D-glucuronide and 3-β-D-glucoside isolated (*Z. Naturforsch.* 1974, *29C*, 355; *Chem. Abstr.* 1974, *81*, 101829 e).

C. intybus L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 64).

Alcoholic extract showed quinidine-like action on isolated toad heart, but with variable potency, showing some promise for treatment of tachycardia, arrhythmia and fibrillation. Alcoholic extract continued to produce effects on heart after ganglionic blockade and atropinisation (*Planta Med.* 1973, *24*, 133); aqueous and alcoholic extracts (200-800 mg/kg. i.p.) showed anticonvulsant and antimetrazole activities; both potentiated pentobarbitone and ethanol-induced hypnosis in mice, exhibited analgesia and anti-inflammatory activity against formalin-induced oedema (*Indian J. Pharmacol.* 1975, *7*, 24).

Cichoriin, esculin, 6,7-dihydroxycoumarin, umbelliferone and scopoletin isolated from inflorescence (*Khim. Prir. Soedin.* 1971, *7*, 115; *Chem. Abstr.* 1971, *74*, 136458 r); caffeic,

chlorogenic, neochlorogenic, 3-feruloyl- and 3-p-coumaroylquininic and dicaffeoyltartaric acids from aerial parts (*Khim. Prir. Soedin*. 1972, *8*, 796; *Chem. Abstr.* 1973, *78*, 94815 e); apigenin, luteolin-7-O-β-D-glucopyranoside, quercitrin, hyperin and apigenin-7-O-L-arabinoside from shoots (*Khim. Prir. Soedin.* 1973, *9*, 119; *Chem. Abstr.* 1973, *79*, 2751 a).

CICUTA (Apiaceae)

C. virosa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 101).

Quercetin, isorhamnetin, kaempferol, rutin, isorhamnetin-3-glucoside, isoquercitrin and narcissin isolated from fruits (*Acta Pol. Pharm.* 1972, *29*, 417; *Chem. Abstr.* 1973, *78*, 94864 v); umbelliferone and scopoletin isolated (*Khim. Prir. Soedin*. 1973, *9*, 112; *Chem. Abstr.* 1973, *79*, 2765 h).

CINCHONA (Rubiaceae)

C. ledgeriana Moens ex Trimen (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 102).

Isolation of quininone, quinine, quinamine and cinchonine (*J. Pharm. Pharmacol.* 1970, *22*, 469); reynoutrin, delphinidin, kaempferol and quercetin from leaves (*Curr. Sci.* 1974, *43*, 479).

BIOLOGICAL ACTIVITY

Cinchophylline and cinchophyllamine were found to be essentially responsible for pharmacodynamic properties of leaves. They were weak CNS depressants, local anaesthetics and hypotensors by virtue of their adrenolytic action. Cinchophylline was psychic depressant with antispasmodic action on smooth muscle, while cinchophyllamine showed analgesic and tonic effects on intestinal and vascular muscles (*Ann. Pharm. Fr.* 1969, *27*, 397; *Chem. Abstr.* 1970, *72*, 65061 b); both quinidine sulphate and quinine sulphate raised ventricular fibrillation threshold, reversed aconitine- induced atrial fibrillation, decreased ouabain-induced abnormal ventricular beats and increased atrial refractory periods and His-Purkinje conduction time. Quinidine sulphate antagonised acetylcholine-induced atrial fibrillation and increased ventricular fibrillation threshold and atrial refractory periods for longer period than quinine sulphate (*Arch. Int. Pharmacodyn. Ther.* 1977, *227*, 57).

C. officinalis L.f. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 64).

Avicularin isolated from leaves (*Curr. Sci.* 1976, *45*, 21)..

C. robusta Howard (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 64).

Avicularin isolated from leaves (*Curr. Sci.* 1976, *45*, 21).

C. succirubra Pavon ex Klotzsch (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 102).

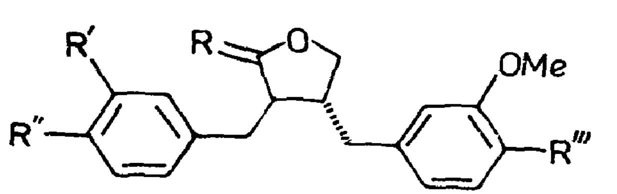
Quinine, quinidine, cinchonine and cinchonidine determined in cortex and tinctures of bark by spectrophotometric assay (*Farm. Pol.* 1976, *32*, 661; *Chem. Abstr.* 1977, *86*, 86126 f).

CINNAMOMUM (Lauraceae)

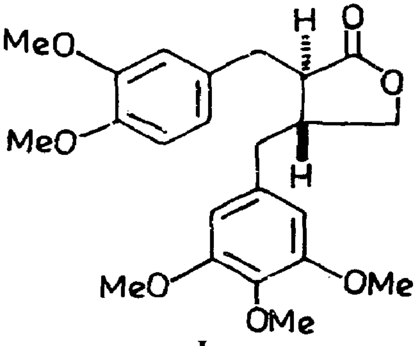
C. camphora (L.) Sieb. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 102).

Methylvinylketone, methylisobutylketone, mesityl oxide, camphene, α-and β-pinene, hexanol, cis-hexen-3-ol, myrcene, (+)limonene, 1,8-cineol, p-cymol, cis- and trans-ocimene, cis- and trans-linalool oxide, (-)linalool, (+)camphor, (-)terpinen-4-ol, α-terpineol, safrole, nerol, geraniol and (+)β-selinene isolated from essential oil of leaves (*Mezhdunar. Kongr. Efirnym Maslam* 1968, *1*, 123; *Chem. Abstr.* 1973, *79*, 9750 h); sesquiterpenoids - 9-oxonerolidol, cis- and trans- 3,7,11-trimethyldodeca-1,7,10-trien-3-ol-9-one and 9-oxofarnesol - from leaves (*Nippon Kagaku Kaishi* 1974, 762; *Chem. Abstr.* 1974, *81*, 60880 u); three new lignans - kusunokinin, cinnamonol and kusunokinol - along with dimethyl matairesinol, hinokinin and dimethyl secoisolariciresinol isolated and characterised from leaves (*Nippon Kagaku Kaishi* 1975, 2192; *Chem. Abstr.* 1976, *84*, 71488 k); two new acyclic monoterpenediols isolated and characterised as 3,7-dimethylocta-1,7-dien-3,6-diol and 3,7-dimethylocta-1,5-dien-3,7-diol (*Phytochemistry* 1976, *15*, 330); a new lignan - (-)trans-2-(3,4-dimethoxybenzyl)-3-(3,4,5-trimethoxybenzyl)-butyrolactone (I) - and (-)trans-3-hydroxy-5,7-dimethoxy-3',4'-methylenedioxyflavan along with dimethyl matairesinol and kusunokinin isolated from heartwood (*Bull. Chem. Soc. Jpn.* 1977, *50*, 2821); detection of carvacrol, cresol, eugenol, alcanfor, borneol, α-pinene, β-pinene, limonene, 1,8-cineol and bornyl acetate in essential oil by GLC (*Riv. Ital. Essenze Profumi, Piante Off., Aromat., Syndets, Saponi, Cosmet., Aerosols* 1978, *60*, 637; *Chem. Abstr.* 1979, *90*, 127385 t); a new cyclopentenone - 5-dodecanyl-4-hydroxy-4-methyl-2-cyclopentenone (II) - from heartwood characterised (*Phytochemistry* 1979, *18*, 488).

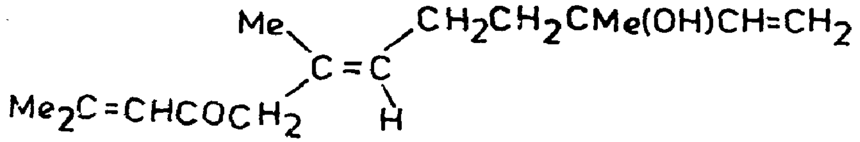
NEW COMPOUNDS



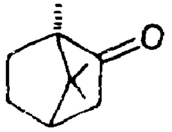
Kusunokinin
R = O, R'R'' = -OCH2O-, R''' = OMe
Kusunokinol
R = OH,H, R',R'',R''' = OMe



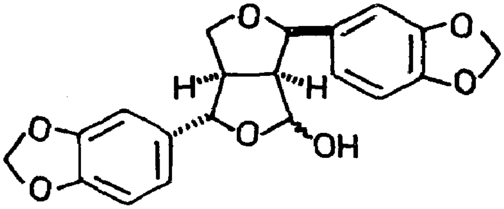
I



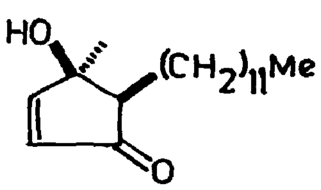
9-Oxonerolidol



Alcanfor



Cinnamonol



II

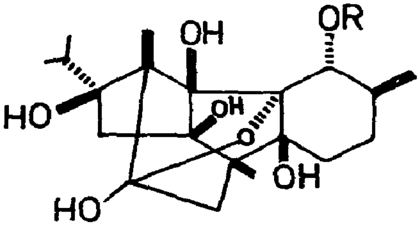
C. tamala (Ham.) Nees & Eberm. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 65).

Essential oil from leaves contained cinnamic aldehyde and eugenol (*Indian Perfum.* 1977, *21*, 15; *Chem. Abstr.* 1978, *88*, 141490 p).

C. verum J. S. Presl. syn. *C. zeylanicum* Blume (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 66).

Two new polyhydroxylated pentacyclic diterpenes - cinnzeylanin and cinnzeylanol - isolated and characterised (*Agric. Biol. Chem.* 1976, *40*, 2305; *Chem. Abstr.* 1977, *86*, 140278 x).

NEW COMPOUNDS



Cinnzeylanin
R = Ac
Cinnzeylanol
R = H

C. zeylanicum Blume; see *C. verum* J. S. Presl.

CIRSIUM (Asteraceae)

C. arvense (L.) Scop. syn. *Cnicus arvensis* Hoffm.(*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 66).

Alkane mixture (C_{18}-C_{31}), β-amyrin, taraxasterol,taraxasterol acetate, tetracosanol, hexacosanol, octacosanol and stigmasterol isolated (*Trans Ill. State Acad. Sci.* North Illinois Univ. 1971, *64*, 300; *Chem. Abstr.* 1972, *77*, 165569 t; *Phytochemistry* 1972, *11*, 2267); 3-O-methylkaempferol from flowers (*Khim. Prir. Soedin.* 1972, *8*, 118; *Chem. Abstr.* 1972, *77*, 85580 b); apigenin-7-β-D-glucuronidopyranoside and acetin-7-β-D-glucuronidopyranoside isolated (*Khim. Prir. Soedin.* 1972, *8*, 240; *Chem. Abstr.* 1972, *77*, 58854 n); flavonol glycoside - linarin - isolated from leaves (*Khim. Prir. Soedin.* 1977, *13*, 282; *Chem. Abstr.* 1977, *87*, 114617 h).

CISSAMPELOS (Menispermaceae)

C. pareira L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990. p. 103).

Leaves extract used for external application in itch, sores and sinuses (*Sci. Cult.* 1972, *38*, 358).

Cycleanine, (-)bebeerine, hayatidin, hayatinin, hayatin and (+)quercitol from leaves (*Sci. Cult.* 1972, *38*, 358).

BIOLOGICAL ACTIVITY

Hayatinin methochloride possessed similar muscle-relaxant properties as d-tubocurarine chloride. During steady partial block by hayatinin, responses to brief tetanic stimulation, to neostigmine and to an increase in calcium concentration were similar to those observed during block by d-tubocurarine. It was concluded that hayatinin caused post-synaptic block (*Jap. J. Pharmacol.* 1970, *20*, 246).

CISSUS (Vitaceae)

C. glauca Roxb. syn. *Vitis glauca* (Roxb.) W. & A.

β-Sitosterol, leucopelargonidin and glucose isolated (*J. Indian Chem. Soc.* 1976, *53*, 1158).

Distribution : Western region of peninsular India from Konkan southwards.

C. quadrangularis L. syn. *Vitis quadrangularis* Wall. ex. W. & A. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra PID, New Delhi, 1990, p. 104).

A glucoside from plant showed negative chronotropic effect on myocardium. It was surface-acting and its effect was surmounted with excess of calcium ion (*Indian J. Med. Sci.* 1971, *25*, 400); plant extract injected in dogs markedly hastened rate of healing in artificially produced fracture of femur (*Indian J. Med. Res.* 1976, *64*, 1365).

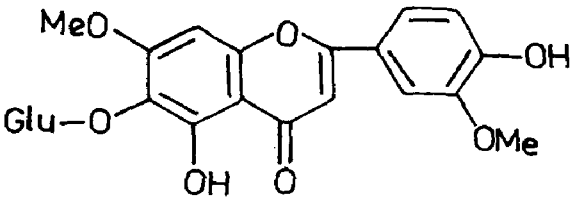
CITHAREXYLUM (Verbenaceae)

C. subserratum Sw.

A new flavone glycoside - 4',5-dihydroxy-3',7-dimethoxyflavone-6- O-glucoside (I) - isolated and characterised (*Phytochemistry* 1976, *15*, 838).

Distribution : Native of America, planted in Indian gardens as ornamental.

NEW COMPOUNDS



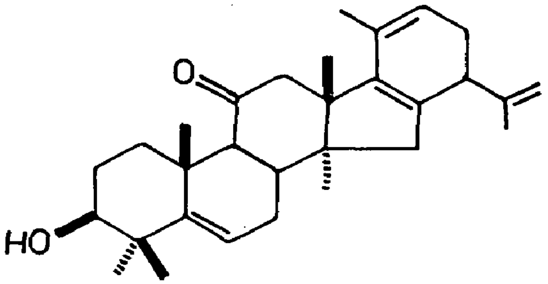
I

CITRULLUS (Cucurbitaceae)

C. colocynthis (L.) Schrad. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 105).

Detection of myristic, palmitic, stearic, myristoleic, palmitoleic, oleic and linoleic acids in fixed oil of seed by GLC (*Planta Med.* 1973, *24*, 41); a new tetracyclic triterpene - citrullonol - isolated from seed oil and its structure elucidated (*Dokl. Bolg. Akad. Nauk* 1975, *28*, 1641; *Chem. Abstr.* 1976, *85*, 33212 d).

NEW COMPOUNDS



Citrullonol

C. lanatus (Thunb.) Mats. & Nakai var. *lanatus* syn. *C. vulgaris* Schrad. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 105).

α-Spinasterol, stigmasta-7,22,25-trienol and stigmasta-7,25-dienol isolated from seed oil (*Taehan Hwahakhoe Chi* 1977, *21*, 193; *Chem. Abstr.* 1977, *87*, 130491 t).

C. vulgaris Schrad.; see *C. lanatus* (Thunb.) Mats. & Nakai var. *lanatus*

CITRUS (Rutaceae)

C. aurantifolia (Christm.) Swingle syn. *C. medica* L. var. *acida* Hook.f. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 67).

5,7-Dimethoxycoumarin, 5-geranyloxy-7-methoxycoumarin, 5,8-dimethoxypsoralen, 5-(2,3-dihydro-3-methylbutoxy)psoralen and another coumarin (probably 5-(6-hydroxy-3,7-dimethyloctadien-2,7-yloxy)-7-methoxycoumarin) isolated from essential oil of Cuban plant (*Ciens. Fis.* 1971, *3*, 111; *Chem. Abstr.* 1973, *78*, 33779 z); 6,7-dimethoxycoumarin identified in peels (*Phytochemistry* 1977, *16*, 1091).

C. aurantium L. syn. *C. aurantium* L. var. *bigaradia* Hook.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehtrotra, PID, New Delhi, 1990, p. 105).

Hesperidin, naringin and poncirin from fruits (*Tr. Prikl. Bot. Genet. Selek.* 1972, *48*, 114; *Chem. Abstr.* 1974, *80*, 68363 c); 6,7-dimethoxycoumarin from peels (*Phytochemistry* 1977, *16*, 1091); detection of α-pinene, β-pinene, limonene, α-phellandrene, decanal, citronellal, α-terpineol, geranyl acetate, geraniol and citral in oil by GLC (*Arch. Bioquim. Quim. Farm.* 1977, *20*, 69; *Chem. Abstr.* 1979, *91*, 181256 k).

BIOLOGICAL ACTIVITY

Injection prepared from dried fruits which contained synephrine and N-methyltyramine when administered i.v. to dogs increased blood pressure and rate of blood circulation in brain, kidney and coronary artery. In guinea pigs, it increased heart contraction, decreased heart rate and caused changes in ECG. LD50 was 78.8 g/kg i.v. in mice (*K'o Hsueh T'ung Pao* 1978, *23*, 58; *Chem. Abstr.* 1978, *88*, 115379 q).

C. aurantium L. var. *bigaradia* Hook.f.; see *C. aurantium* L.

C. japonica Thunb.; see *Fortunella japonica* (Thunb.) Swingle

C. limetta Risco syn. *C. limettioides* Tanaka, *C. medica* Linn. var. *limetta* W. & A. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 68).

α-Pinene, camphene, β-pinene, myrcene, α-phellandrene, 3-carene, (+)limonene, p-cymene, γ-terpinene, terpinolene, nonyl aldehyde and citronellal from essential oil (*Essenze Deriv. Agrum.* 1969, *39*, 115; *Chem. Abstr.* 1970, *72*, 136288 u).

C. limettioides Tanaka; see *C. limetta* Risco

C. madurensis Lour.; see *C. mitis* Blanco

C. medica L. var. *acida* Hook.f.; see *C. aurantifolia* (Christm.) Swingle

C. medica L. var. *limetta* W. & A.; see *C. limetta* Risco

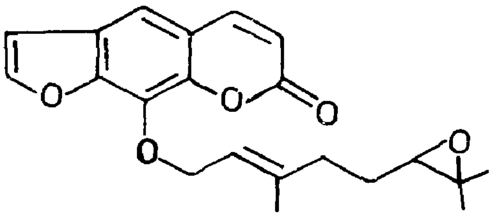
C. mitis Blanco syn. *C. madurensis* Lour. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 107).

6,7-Dimethoxycoumarin isolated from peels (*Phytochemistry* 1977, *16*, 1091).

C. paradisi Macf. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 108).

6,7-Dimethoxycoumarin from peels (*Phytochemistry* 1977, *16*, 1091); two flavones - 5,6,7,8,4'-pentamethoxyflavone and 5,6,7,8,3'4'-hexamethoxyflavone - four coumarins - 7-[(3,7-dimethyl-6-epoxy-trans-2-octenyl)oxy]coumarin, 7-[(3,7-dimethyl-2,7-octadienyl)oxy] coumarin, 7-methoxy-8-(2,3-epoxy-isopentyl)coumarin and 7-methoxy-8-(2,3-dihydroxy-isopentyl)coumarin - three psoralens - a new 5-[(3,7-dimethyl-6-epoxy-2-octenyl)oxy]-psoralen (I), 5(6,7-dihydroxy-3,7-dimethyl-2-octenyl)oxy]psoralen,bergamottin and bergaptol - isolated from grapefruit peel oil and characterised (*Phytochemistry* 1979, *18*, 500).

NEW COMPOUNDS



C. reticulata Blanco (*Compend. Indian Med. Plant*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 109).

6,7-Dimethoxycoumarin from peels (*Phytochemistry* 1977, *16*, 1091); nobiletin, ponkanetin, 5-demethylnobiletin, 6,7-dimethylesculetin, 4,5,7,8-tetramethoxyflavone, limonin, cholesterol, campesterol, stigmasterol and β-sitosterol isolated from peels (*Tai-wan Yao Hsueh Tsa Chih* 1977, *29*, 1; *Chem. Abstr.* 1979, *90*, 148494 t).

C. sinensis (L.) Osbeck (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 109).

β-Citaurin and reticulataxanthin present as esters in peel (*Wiss. Technol.* 1970, *3*, 52; *Chem. Abstr.* 1970, *73*, 84629 e); nootkatene and an unidentified sesquiterpene isolated (*Phytochemistry* 1970, *9*, 2419); six new flavonoids - 3,3′,4′,5,6,7-hexamethoxyflavone (I), 3,3′,4′,5,7,8-hexamethoxyflavone (II), 5-hydroxy-3,3′,4′,7,8-pentamethoxyflavone (III), 5-hydroxy-3,6,7,8,3′,4′-hexamethoxyflavone, 5,7,8,4′-tetramethoxyflavone and 5,7,8,3′,4′-pentamethoxyflavone - along with 3,5,6,7,8,3′,4′-heptamethoxyflavone, 5,6,7,8,4′-pentamethoxyflavone, 5,6,7,4′-tetramethoxyflavone, 5,6,7,3′,4′-pentamethoxyflavone, 5,6,7,8,3′,4′-hexamethoxyflavone - isolated from peel and characterised (*Phytochemistry* 1972, *11*, 2283); orange peels contained nineteen carotenoids (11.16 mg%) of which fifteen identified as cryptoxanthin, n-carotene, β-zeacarotene, sintaxanthin, mutatochrome, β-apo-2-carotenal, β-apo-10-carotenal (all with provitamin A activity), trollixanthin,phytoene, phytofluene, hydroxy-α-carotene, luteoxanthin, auroxanthin and two phytoene-like substances (*Subtrop. Kul't* 1977, 154; *Chem. Abstr.* 1978, *89*, 211937 m).

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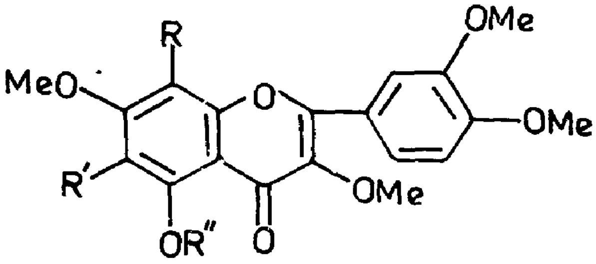

I

R = H, R′ = OMe, R″ = Me

II

R = OMe, R′ = H, R″ = Me

III

R = OMe, R′, R″ = H

CLAOXYLON (Euphorbiaceae)

C. indicum Hassk.; see *C. polot* (Burm.f.) Merr.

C. polot (Burm.f.) Merr. syn. *C. indicum* Hassk.

3β-Acetoxy-30-norlupan-20-one along with friedelin, sitosterol and 3β-hydroxy-30-nor-lupan-20-one isolated from Hong Kong plant and characterised (*Phytochemistry* 1977, *16*, 607).

Distribution : South India.

CLAUSENA (Rutaceae)

C. excavata Burm.f. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 69).

Clausenin and clausenidin isolated from roots and stem bark (*J. Indian Chem. Soc.* 1973, *50*, 753).

C. heptaphylla W. & A. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 110).

Structure of clausenidin revised; dentatin, mp. 90°, found identical with poncitrin (*Indian J. Chem.* 1970, *8*, 198); structure of a new carbazole alkaloid - heptazoline - isolated from stem bark (*J. Indian Chem. Soc.* 1970, *47*, 1197); isolation of heptaphylline and girinimbine from roots; structure elucidation of heptaphylline (*Phytochemistry* 1972, *11*, 2065); murrayanine, mp. 168°, and dentatin isolated (*Phytochemistry* 1973, *12*, 1831); 3-methylcarbazole isolated from roots (*Phytochemistry* 1974, *13*, 1017); isolation and structure of heptazolidine (*Chem. Ind.* 1974, 303); murrayacine isolated (*Phytochemistry* 1976, *15*, 356); 2-methylanthraquinone isolated from stem bark (*Phytochemistry* 1978, *17*, 2043); isolation and crystal structure of clausenolide (*Chem. Commun.* 1979, 246).

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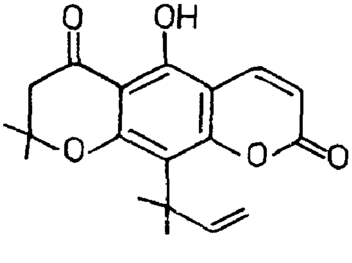
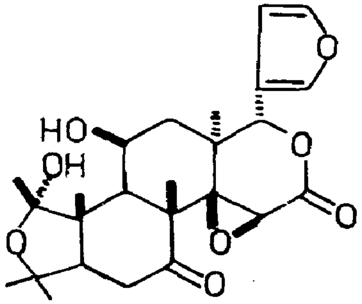
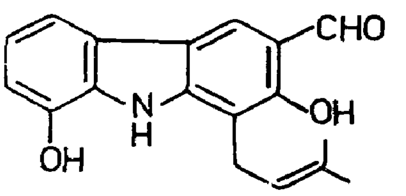


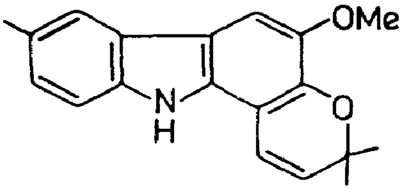
Clausenidin



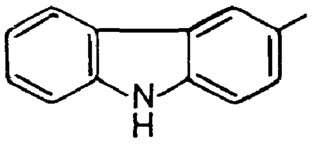
Clausenolide



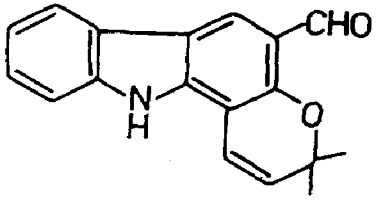
Heptazoline



Heptazolidine



3-Methylcarbazole



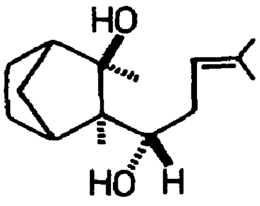
Murrayacine

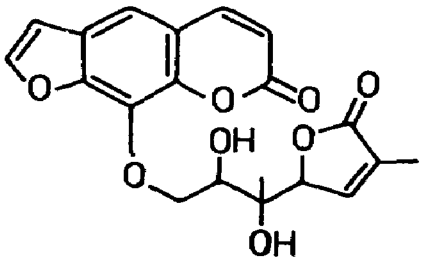
C. indica (Dalz.) Oliv.

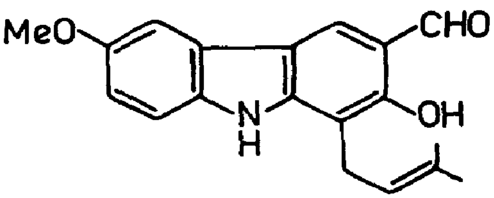
Imperatorin, phellopterin, chalepensin and chalepin isolated from roots; chalepensin found to be identical with xylotenin (*Phytochemistry* 1971, *10*, 480); structure elucidation of a new carbazole alkaloid - 6-methoxyheptaphylline - isolated from roots (*Indian J. Chem.* 1972, *10*, 1123); a new coumarin - clausindine - isolated from roots and characterised as 3-(2,2-dimethylcyclopropyl)psoralen [rutolide from *C. montana* earlier assigned same structure] (*Experientia* 1974, *30*, 223; *J. Chem. Soc.* Perkin 1 1974, 1561); isolation and structure of a furanoquinone (I) (*J. Chem. Soc.* Perkin 1 1974, 1561); structure of a new alkaloid - indizoline - isolated from roots along with 3-methylcarbazole (*Indian J. Chem.* 1974, *12*, 437); structure and isolation of a new sesquiterpene - clausantalene (*Experientia* 1975, *31*, 138); structure of indicolactonediol determined (*Phytochemistry* 1978, *17*, 1194).

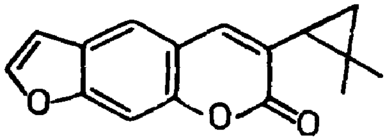
Distribution : Western Ghats.

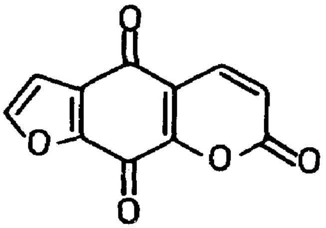
NEW COMPOUNDS

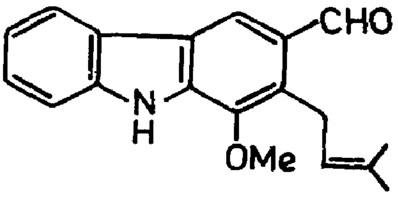

Clausantalene


Indicolactonediol


6-Methoxyheptaphylline


Clausindine

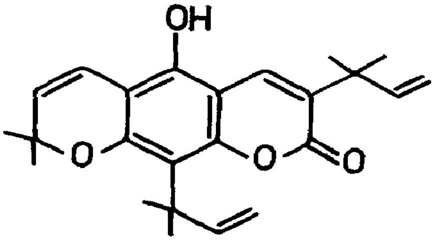

I


Indizoline

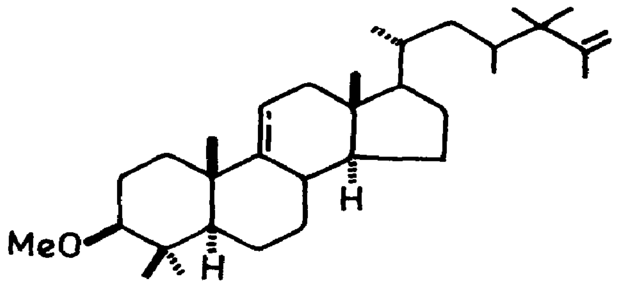
C. pentaphylla (Roxb.) DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 69).

A new coumarin - clausarin - isolated and characterised as 3,10-bis(1,1-dimethylallyl)-8,8-dimethyl-5-hydroxy-2H,8H-benzo(1,2-b;5,4-b′)dipyran-2-one along with dentatin, clausenidin, β-sitosterol, heptaphylline and methyl linolenate from roots (*Experientia* 1977, *33*, 412); O-methylclausenol isolated from roots and characterised as 3β-methoxy-23,24,24-trimethyl-lanosta-9(11),25-diene (*Experientia* 1977, *33*, 153); isolation of spasmolytic coumarins - clausmarins A and B - and their structure elucidation (*Chem. Commun.* 1978, 281).

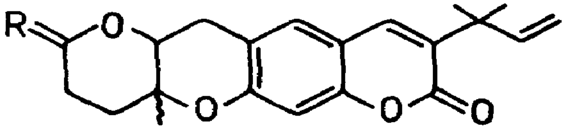
NEW COMPOUNDS



Clausarin



O-Methylclausenol



Clausmarin A
R = β-CMe_2OH,H
Clausmarin B
R = α-CMe_2OH,H

CLAVICEPS (Clavicipilaceae)

C. microcephala (Wallr.) Tul.

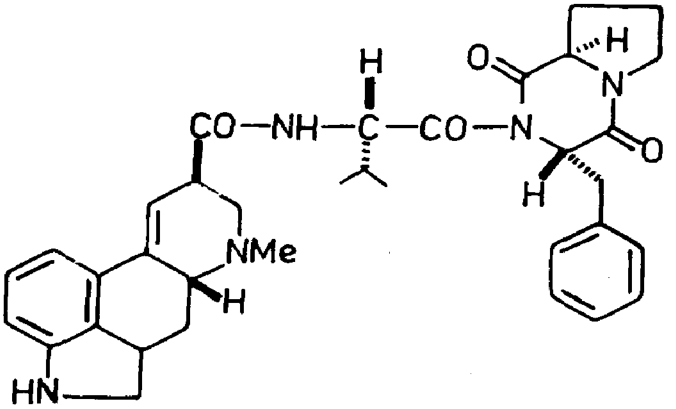
Sclerotia contained mostly clavine alkaloids with only traces of ergotamine and ergometrine; chief alkaloidal constituents were agroclavine, elymoclavine and chanoclavine (*Arogya* 1976, 2, 115).

Distribution : Reported from Maharashtra.

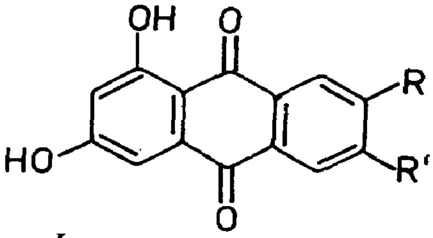
C. purpurea (Fr.) Tul. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 110).

Isolation and structure of a new pigment (I), mp. 188° (*Pharmazie* 1970, *25*, 367; *Chem. Abstr.* 1970, *73*, 101984 m); structures of ergochrysin A, isoergochrysin A and ergoxanthin established (*J. Chem. Soc.* C 1971, 3581); a new alkaloid - ergocristine - isolated from mycelium and characterised as N-[N-(d-lysergyl)-L-valyl]-L-phenylalanyl-D-proline lactam (*Experientia* 1973, *29*, 936; *Collect. Czech. Chem. Commun.* 1976, *41*, 3415); a new alkaloid - ergovalide - isolated and structure determined (*Khim. Prir. Soedin.* 1973, *9*, 134; *Chem. Abstr.* 1973, *78*, 159955 x); crystal structure of secalonic acid A (*J. Chem. Soc.* Perkin 1 1976, 1820); method for separation of ergot alkaloids from ergot and saprophyte Claviceps fermentation media (Hung. 13,770 (1977) August 26; *Chem. Abstr.* 1978, *88*, 141684 e); isolation and structure of α-ergocryptine from Argentine ergot (*Lloydia* 1978, *41*, 179); structure of 6,7-seco-agroclavine confirmed by synthesis (*Phytochemistry* 1979, *18*, 519); three new ergot alkaloids - ergovaline, ergoptine and ergonine - isolated (*Can. J. Chem.* 1979, *57*, 1638).

NEW COMPOUNDS

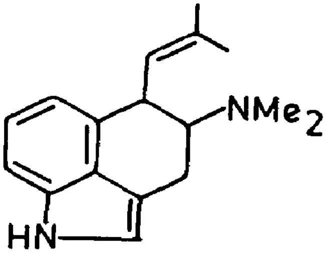


Ergocristine

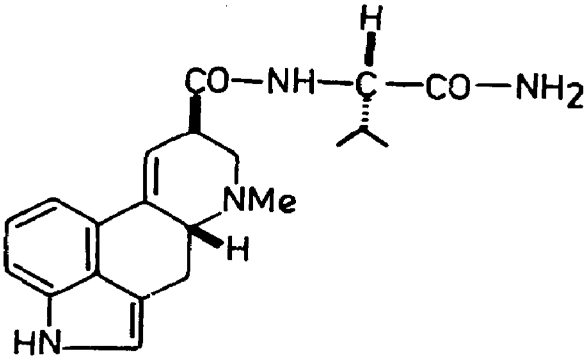


I

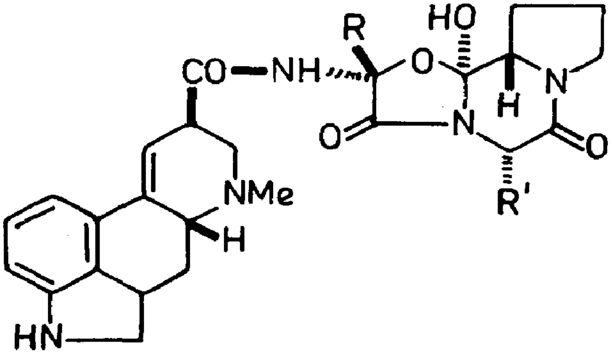
R = Me/H, R′ = H/Me



6,7-Seco-agroclavine



Ergovalide



Ergovaline

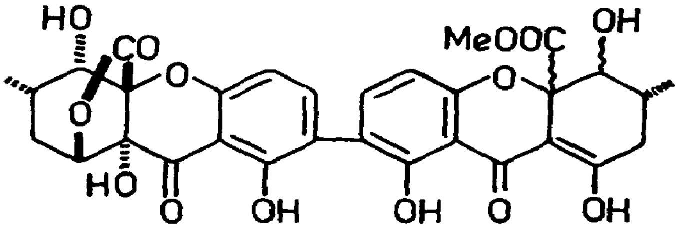
R = Me, R′ = $CHMe_2$

Ergoptine

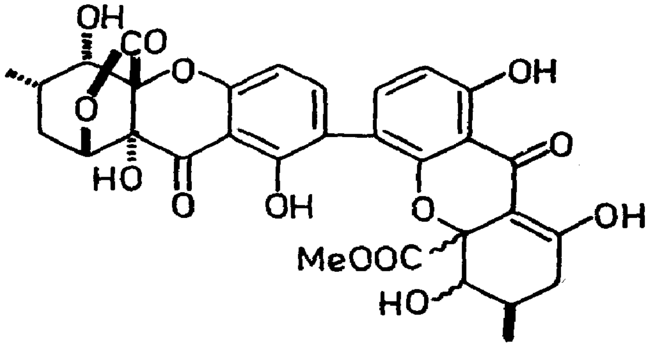
R = CH_2Me, R′ = CH_2CHMe_2

Ergonine

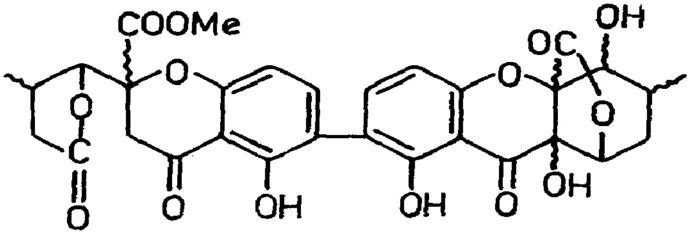
R = CH_2Me, R′ = $CHMe_2$



Ergochrysin A



Isoergochrysin A



Ergoxanthin

BIOLOGICAL ACTIVITY

Ergometrine (10 mg/kg) caused strong and long-lasting stimulation of locomotor activity in rats which was due to direct action on dopamine receptors in brain (*J. Pharm. Pharmacol.* 1974, *26*, 455); ergot alkaloids together with dopamine agonists,apomorphine and piribedil, tested for protective effect against audiogenic seizures in inbred strain of mice (DBA/2) and for induction of circling behaviour in mice with unilateral destruction of one nigrostriatal DA pathway. The order of potency against audiogenic seizures was apomorphine ergoconine ergometrine LSD piribedil; while in rotating mouse model the potency order was apomorphine ergometrine ergocornine piribedil (*Eur. J. Pharmacol.* 1976, *37*, 295); prior intracarotid injection of either ergotamine (0.6 μg) or dihydroergotoxine (6-22 μg) attenuated depression of evoked cortical potentials caused by brief periods of cerebral ischaemia in cats; in hypercapnic cats protection afforded by alkaloids appeared to be due to a metabolite effect rather than a vasodilatory effect (*Pharmacology* 1974, *12*, 152; *Chem. Abstr.* 1975, *82*, 51535 d); persons receiving dihydroergotoxine 3 mg orally or sublingually excreted 0.41-0.46% of

unchanged drug in urine during 32 hr Peak concentrations of drug found in urine during first four hr suggested rapid gastrointestinal absorption (*Acta Pharmacol. Toxicol.* 1977, *40*, 541; *Chem. Abstr.* 1977, *87*, 62338 w); postpartum ergotamine (0.01-0.012 mg/kg, i.m.) and methylergometrine (0.004-0.0048 mg/kg, i.m.) effective in treatment of uterine contraction insufficiency and involution in cattle; ergotamine was effective for 10 hr compared to two hr for methylergometrine. Ergotamine also hastened onset of estrus and increased fertility rate (*Visn. Sil's'kohospod. Nauky* 1977, 56; *Chem. Abstr.* 1977, *86*, 183315 z).

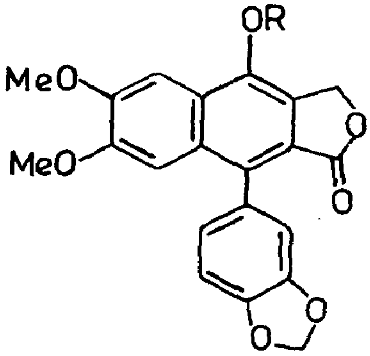
CLEISTANTHUS (Euphorbiaceae)

C. collinus (Roxb.) Benth. ex Hook.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 112).

Leaves, roots and fruits acted as violent gastrointestinal irritants; used as fish poison; leaves were abortifacient (*J. Oil Technol. Assoc.* India 1977, *9*, 156; *Chem. Abstr.* 1978, *88*, 117829 k).

A new glycoside - diphyllin-O-glucoside (cleistanthin B) - isolated from bark (*Curr. Sci.* 1970, 39, 395); cleistanthin, a diphyllin glycoside from heartwood, characterised as diphyllin-4-O-[β-2,3-di-O-methylxylopyranosyl (1→4)β-D-glucopyranoside (*Phytochemistry* 1975, *14*, 1875; *Indian J. Chem.* 1977, *15*B, 10); determination of palmitic (26.0), palmitoleic (10.0), stearic (16.0), oleic (48.0) and protein isolates (18.2%) in seed oil (*J. Oil Technol. Assoc.* India 1977, *9*, 156; *Chem. Abstr.* 1978, *78*, 117829 k).

NEW COMPOUNDS



Cleistanthin B
R = Glu
Cleistanthin
R = Glu(4→1)2,3-di-O-methylxylose

CLEOME (Capparaceae)

C. gynandra L. syn. *C. pentaphylla* L., *Gynandropsis gynandra* (L.) Briq., *G. pentaphylla* (L.) DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 112).

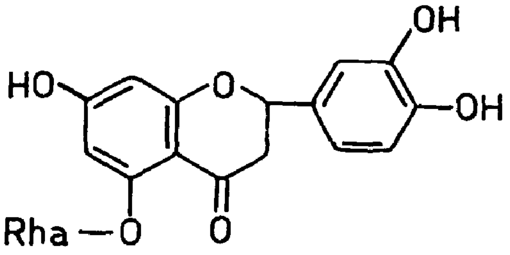
Glucoiberine, glucocapparine, neoglucobrassicin and glucobrassicin isolated (*Pharmazie* 1976, *31*, 818; *Chem. Abstr.* 1977, *86*, 52677 w).

C. icosandra L., see *C. viscosa* L.

C. pentaphylla L., see *C. gynandra* L.

C. viscosa L. syn. *C. icosandra* L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 70).

Seed oil rich in linoleic acid (*Indian J. Med. Res.* 1978, *67*, 604); isolation and characterisation of eriodictyol-5-rhamnoside (3′,4′,7-trihydroxyflavanone-5-O−α-L-rhamnopyranoside) from whole plant (*Indian J. Chem.* 1979, *18*B, 86);kaempferide-3-glucuronide obtained from roots (*Phytochemistry* 1979, *18*, 691); dihydrokaempferide-3-glucuronide and docosanoic acid isolated from roots (*Chem. Ser.* 1979, *13*, 24; *Chem. Abstr.* 1979, *91*, 87311 c).
NEW COMPOUNDS



Eriodictyol-5-rhamnoside

CLERODENDRUM (CLERODENDRON) (Verbenaceae)

C. indicum (L.) O. Kuntze syn. *C. siphonanthus* R. Br. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 71).

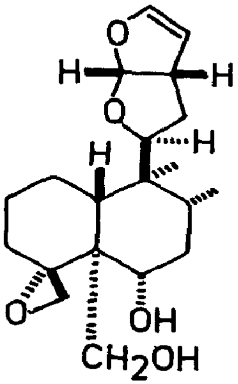
Detection of (24S)ethylcholesta-5,22,25-trien-3β-ol in leaves (*Phytochemistry* 1973, *12*, 2078); hispidulin, scutellarein-7-O-glucuronide and hispidulin-7-O-glucuronide isolated from leaves (*Phytochemistry* 1973, *12*, 1195).

C. inerme (L.) Gaertn. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 71).

Alcoholic extract of leaves stimulated pregnant uterus, raised blood pressure and increased intestinal movements in rat. Aqueous extract of plant stimulated uterine motility at different stages of sex cycle in isolated rat uterus. Plant did not produce toxic effects with doses as high as 8g/kg (*Qual. Plant. Mater. Veg.* 1969, *17*, 293; *Chem. Abstr.* 1970, *72*, 99004 a).

(24S)Ethylcholesta-5,22,25-trien-3β-ol and 7-O-glucuronides of apigenin and scutellarein isolated from leaves (*Indian J. Pharm.* 1973, *35*, 191); revision of structure, stereochemistry and absolute configuration of clerodin (*Chem. Commun.* 1979, 97).

NEW COMPOUNDS



Clerodin

C. infortunatum L.; see *C. viscosum* Vent.

C. multiflorum (Burm.f.) O. Kuntze syn. *C. phlomidis* L.f. (*phlomoides*) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 113).

Scutellarein and pectolinarigenin (4′,6-dimethylscutellarein) isolated from leaves (*Phytochemistry* 1972, *11*, 3095); detection of (24S)ethylcholesta-5,22,25-trien-3β-ol in leaves (*Phytochemistry* 1973, *12*, 2078).

C. neriifolium (Roxb.) Wall. ex DC.

Scutellarein-4′-L-arabinoside and acacetin-7-glucoside isolated from leaves (*J. Indian Chem. Soc.* 1972, *49*, 1061); detection of (24S)ethylcholesta-5,22,25-trien-3β-ol in leaves (*Phytochemistry* 1973, *12*, 2078).

Distribution : Pondicherry.

C. phlomidis L.f.; see *C. multiflorum* (Burm.f.) O. Kuntze

C. serratum (L.) Moon (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 113).

Saponins caused disruption of mast cells of rat mesentery which was proportional to dose upto 40 μg and maximum disruption effect was exerted in 30 min (*Indian J. Med. Sci.* 1971, *25*, 29).

C. siphonanthus R. Br.; see *C. indicum* (L.)O. Kuntze

C. viscosum Vent. syn. *C. infortunatum* auct. (non L.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 113).

Detection of (24S)ethylcholesta-5,22,25-trien-3β-ol in leaves and flowers (*Phytochemistry* 1973, *12*, 2078; *J. Indian Chem. Soc.* 1977, *54*, 1104); seed fat rich in palmitic (12.6), oleic (74.0) and linoleic (7.7%) acids (*J. Oil Technol. Assoc.* India 1973, *5*, 8; *Chem. Abstr.* 1973, *78*, 156602 u); scutellarein-7-O-glucuronide and hispidulin-7-O-glucuronide isolated from leaves

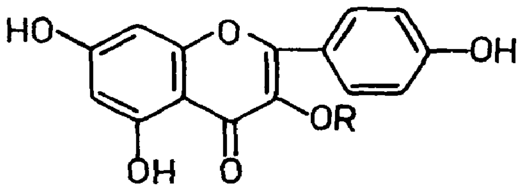
(*Phytochemistry* 1973, *12*, 1195); clerodin and hentriacontane isolated from flowers (*J. Indian Chem. Soc.* 1977, *54*, 1104).

CLITORIA (Papilionaceae)

C. ternatea L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 114).

Kaempferol-3-O-rhamnosyl(1→6)-glucoside and kaempferol-3-O-rhamnosyl(1→6)galactoside (*Indian J. Chem.* 1973, *11*, 89); kaempferol-3-O-glucoside, kaempferol-3-O-rutinoside, kaempferol- 3-O-neohesperidoside and clitorin, mp. 198° which was characterised as kaempferol-3-O-rhamnosyl (1→2)-O-rhamnosyl (1→2)-O-[rhamnosyl-(1→6)]-glucoside isolated from leaves of Formosan plant (*Yakugaku Zasshi* 1977, *97*, 649; *Chem. Abstr.* 1977, *87*, 114551 g); malvidin-3β-glucoside, delphinidin-3β-glucoside and 3'-methyl ether of delphinidin-3β-glucoside from blue flowers (*Planta Med.* 1977, *32*, 138); stigmast-4-ene-3,6-dione isolated (*Pharmazie* 1978, *33*, 82; *Chem. Abstr.* 1978, *88*, 186110 f).

NEW COMPOUNDS



Clitorin
R = Glu[(2→1)Rha](6→1)Rha

CNICUS (Asteraceae)

C. arvensis Hoffm.; see *Cirsium arvense* (L.) Scop.

COCCINIA (Cucurbitaceae)

C. cordifolia Cogn.; see *C. grandis* (L.) Voigt

C. grandis (L.) Voigt syn. *C. cordifolia* Cogn., *C. indica* W. & A., *Cephalandra indica* Naud. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 115).

β-Sitosterol and taraxerol from fruits (*Trans. Bose Res. Inst.*, Calcutta 1972, *35*, 43; *Chem. Abstr.* 1974, *80*, 35072 d); seed fat rich in palmitic (16.3), oleic (22.4) and linoleic (58.6%) acids (*J. Oil Technol. Assoc.* India 1973, *5*, 8; *Chem. Abstr.* 1973, *78*, 156602 u); β-carotene, lycopene, cryptoxanthin and apo-6'-lycopenal obtained from fruits (*Curr. Sci.* 1979, *48*, 630).

C. indica W. & A.; see *C. grandis* (L.) Voigt

COCCULUS (Menispermaceae)

C. hirsutus (L.) Diels syn. *C. villosus* (Lamk.) DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 115).

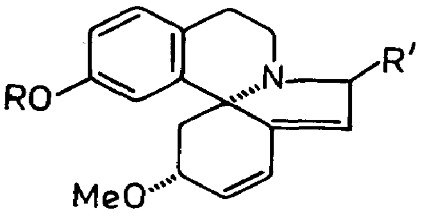
Trilobine, isotrilobine, coclaurine and magnoflorine from stems and roots (*Indian J. Chem.* 1976, *14*B, 62).

C. laeba (Delile) DC.; see *C. pendulus* (J. R. & G. Forst.) Diels

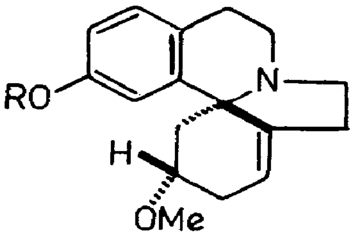
C. laurifolius DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 116).

Erythroculine isolated from leaves and characterised (*Chem. Pharm. Bull.* 1970, *18*, 1951; *Yakugaku Zasshi* 1970, *90*, 92; *Chem. Abstr.* 1970, *72*, 87186 y); l-reticuline, laurifoline and magnoflorine isolated from leaves (*Yakugaku Zasshi* 1970, *90*, 92; *Chem. Abstr.* 1970, *72*, 87186 y); isolation of cocsulinine, mp. 260°, from stems and leaves and structure assigned (*Indian J. Chem.* 1974, *12*, 517); new dibenz[d,f]azonine alkaloids - laurifonine, laurifine and laurifinine - isolated and their structures determined (*J. Chem. Soc.* Perkin 1, 1976, 2197); new erythrina alkaloids - cocculidine, cocculine, isococculidine and coccoline - isolated from leaves and characterised (*Phytochemistry* 1976, *15*, 739); coccuvine isolated and its structure and stereochemistry established (*Experientia* 1976, *32*, 1368); a new abnormal erythrina alkaloid - coccuvinine, mp. 103° - isolated from leaves and structure elucidated (*Indian J. Chem.* 1977, *15*B, 388); another abnormal erythrina alkaloid - cocculitine - isolated and characterised (*Lloydia* 1977, *40*, 322); structure and stereochemistry of abnormal erythrina alkaloid - isococculine - from leaves (*Nat. Acad. Sci. Lett.* 1978, *1*, 93; *Chem. Abstr.* 1978, *89*, 129767 x).

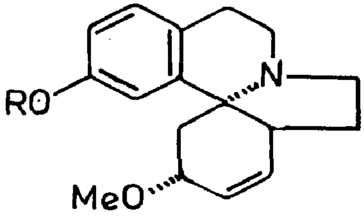
NEW COMPOUNDS



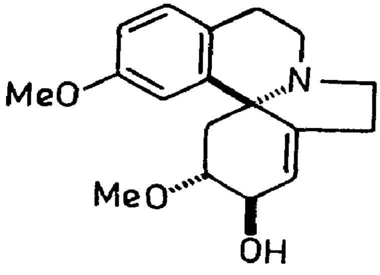
Coccoline
R = H, R' = O
Coccuvinine
R = Me, R' = H,H



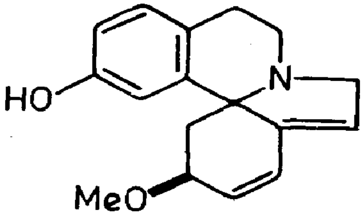
Cocculine
R = H
Cocculidine
R = Me



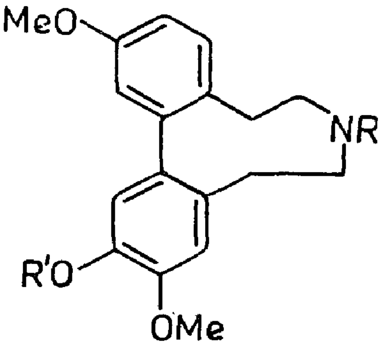
Isococculine
R = H
Isococculidine
R = Me



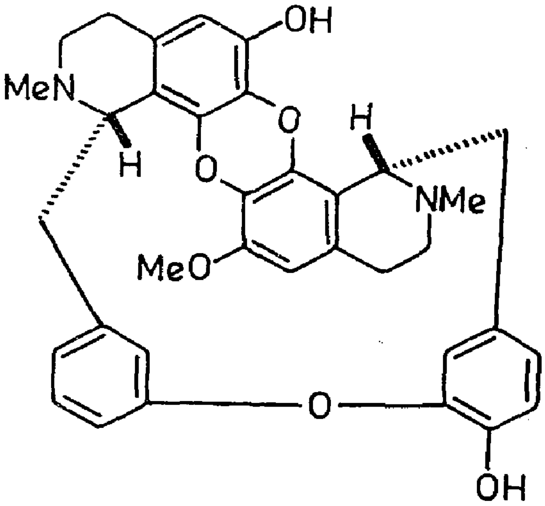
Cocculitine



Coccuvine



Laurifonine
R,R' = Me
Laurifine
R = H, R' = Me
Laurifinine
R = Me, R' = H



Cocsulinine

BIOLOGICAL ACTIVITY

Cocculine nitrate and cocculidine nitrate showed hypotensive action in dogs due to their ganglionic blocking action (*Farmakol. Alkaloidov Serdech. Glikozidov* 1971, 197; *Chem. Abstr.* 1972, *77*, 135092 s). Cocsulinine showed anticancer activity (*Indian J. Chem.* 1974, *12*, 512).

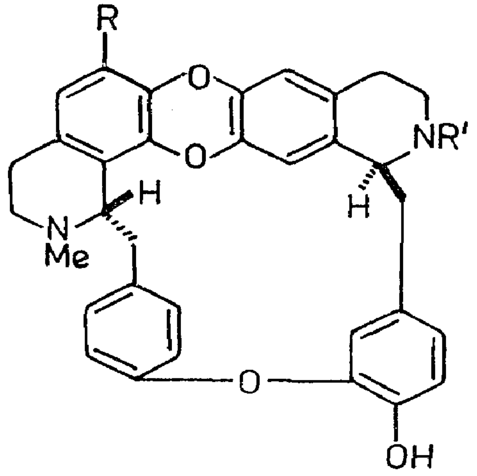
Intra-arterial injection of isococculidine HCl (250 μg) produced progressive neuromuscular blockade which was more marked on indirectly elicited twitches than on directly stimulated muscle contraction. On i.v. administration it produced neuromuscular blockade associated with more marked hypotension than d- tubocurarine. It directly inhibited denervated skeletal muscle. It also showed ganglion blocking action. LD50 of isococculidine i.p. in mice was 50 mg/kg (*Indian J. Exp. Biol.* 1977, *15*, 547).

C. macrocarpus W. & A.; see *Diploclisia glaucescens* (Bl.) Diels

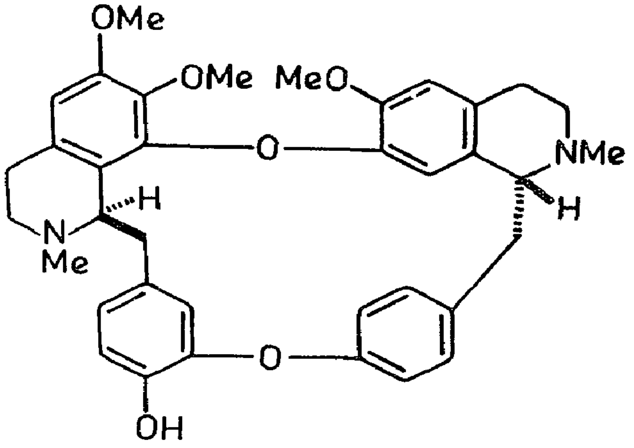
C. pendulus (J. R. & G. Forst.) Diels syn. *C. laeba* (Delile) DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 116).

A new bisbenzylisoquinoline alkaloid - cocsulin, mp. 272° - isolated and structure assigned (*Experientia* 1970, *26*, 241; *Curr. Sci.* 1978, *47*, 768); a new biscoclaurine alkaloid - pendulin, mp. 192° - isolated and its structure elucidated (*Experientia* 1970, *26*, 12); structure and stereochemistry of cocsolin isolated from leaves and stems (*Indian J. Chem.* 1974, *12*, 649); cocsulinin and pendulinin together with cocsulin and cocsolin isolated (*Tetrahedron* 1975, *31*, 2575); choline; hentriacontanol and β-sitosterol isolated from leaves (*Curr. Sci.* 1978, *47*, 768).

NEW COMPOUNDS



Cocsolin
R = OMe, R' = H
Cocsulin
R = H, R' = Me



Pendulin

C. villosus (Lamk.) DC.; see *C. hirsutus* (L.) Diels

COCHLEARIA (Brassicaceae)

C. armoracia L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 72).

Isopropyl, allyl, 3-butenyl, 4-pentenyl, phenyl, 3-methylthiopropyl, benzyl and β-phenylethyl isothiocyanates detected in hydrolysate of plant extract by GCMS (*Yakugaku Zasshi* 1973, *93*, 453; *Chem. Abstr.* 1973, *79*, 89460 b).

COCOS (Arecaceae)

C. nucifera L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 116).

Detection of phenol, p-cresol, caproic acid and p-hydroxybenzoic acid by TLC in shell fibres; in addition, tar from shells contained crotonaldehyde, furfural and acetic acid (*Curr. Sci.* 1973, *42*, 841; *Indian J. Pharm.* 1973, *35*, 176).

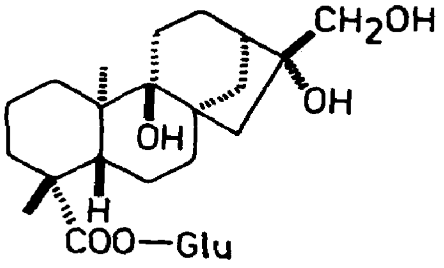
COFFEA (Rubiaceae)

C. arabica L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 116).

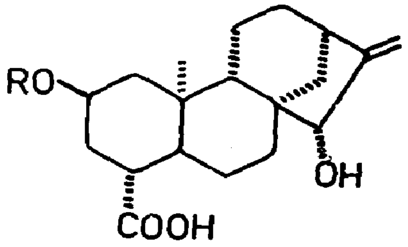
Seed oil contained palmitic (34.1), stearic (8.2), oleic (8.5) and linoleic acids(44.1%) (*Indian J. Appl. Chem.* 1972, *35*, 35; *Chem. Abstr.* 1973, *79*, 96832 c); a new kauran-18-oic acid glucopyranosyl ester - cofaryloside - isolated from green beans and characterised (*Chem. Ber.*

1977, *110*, 1963); a new atractyligenin glycoside characterised as 2-O-(2′-O-isovaleryl-β-D-glucopyranosyl)atractyligenin (I) from beans (*Chem. Ber.* 1978, *111*, 3506).

NEW COMPOUNDS



Cofaryloside



I

R = Glu(2′-O-isovaleryl)

C. robusta Linden

Eng. - Congo Coffee.

Seed oil contained palmitic (34.1), stearic (9.9), oleic (8.6) and linoleic acids(40.5%) (*Indian J. Appl. Chem.* 1972, *35*, 35; *Chem. Abstr.* 1973, *79*, 96832 c).

Distribution : Native of Zaire, introduced into south India particularly in Kerala and Karnataka states, alt. 300-600 m.

COIX (Poaceae)

C. lacryma-jobi L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 73).

An anticancer agent - coixenolide - isolated from pearled grain (0.25%) (*Chanyonmul Hwahak Yonguso Yongu Pogo* 1974, *2*, 13; *Chem. Abstr.* 1977, *87*, 130483 s); 2,4-dihydroxy-7-methoxy-2H-1,4-benzoxazin-3-one and two biogenetically related metabolites, characterised as 2-hydroxy-7-methoxy-2H-1,4-benzoxazin-3-one and 6-methoxybenzoxazolinone, in seedlings (*Ann. Fac. Sci. Agrar. Univ. Studi Napoli, Portici* 1978, *12*, 78; *Chem. Abstr.* 1979, *91*, 2528 f).

COLA (Sterculiaceae)

C. acuminata (Beauv.) Schott & Endl. syn. *Garcinia kola* Heckel (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 117).

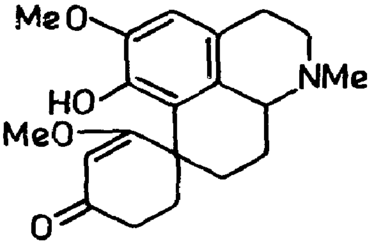
β-Sitosterol isolated from seeds; lipid from seed consisted of unsaturated (56.57) and saturated (36.19%) acids; stearic, palmitic, myristic and oleic acids identified (*East. Pharm.* 1978, *21*, 159; *Chem. Abstr.* 1978, *89*, 193833 t).

COLCHICUM (Liliaceae)

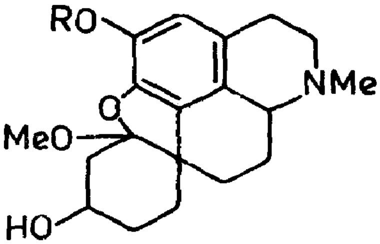
C. luteum Baker (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 118.)

Luteidine isolated and characterised (*Khim. Prir. Soedin.* 1976, *12*, 354; *Chem. Abstr.* 1977, *86*, 43863 b); structure of luteicine elucidated (*Khim. Prir. Soedin.* 1976, *12*, 359; *Chem. Abstr.* 1977, *86*, 43864 c); luteine isolated and structure assigned (*Khim. Prir. Soedin.* 1976, *12*, 801; *Chem. Abstr.* 1977, *86*, 190283 r); β- and γ-lumicolchicines, N-formyldesacetyl colchicine and 3-demethyl-N-desacetylformylcolchicine and 3-demethylcolchicine isolated from corms; corms and aerial parts contained total alkaloids (0.94 and 0.70) and colchicine (0.40 and 0.20%) respectively (*Indian J. Pharm.* 1977, *39*, 115).

NEW COMPOUNDS



Luteidine



Luteicine
R = Me
Luteine
R = H

BIOLOGICAL ACTIVITY

Colchicine (500 μM) inhibited catecholamine secretion evoked by acetylcholine (20 μg/ml) but not of that induced by excess potassium in perfused rabbit adrenal glands (*Brit. J. Pharmacol.* 1972, *45*, 129); colchicine (33 mg/kg, p.o.) suppressed development of carrageenin-induced oedema in rat (*J. Pharmacol. Exp. Ther.* 1975, *194*, 154); colchicine (2.5 mg/kg, i.v.) when administered in rats decreased plasma calcium from 4.51 to 3.61 mg/100 ml and increased parathyroid hormone (PTH) from 80 to 287 pg/ml (*Endocrinology* 1977, *101*, 1792).

COLEUS (Lamiaceae)

C. amboinicus Lour. syn. *C. aromaticus* Benth. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 74).

Cirsimaritin and β-sitosterol-β-D-glucoside identified in leaves (*J. Indian Chem. Soc.* 1976, *53*, 1064); oleanolic, 2α,3α-dihydroxyolean-12-en-28-oic, crategolic, pomolic, euscaphic, tormentic, ursolic and 2α,3α,19α,23-tetrahydroxyurs-12-en-28-oic acids isolated from leaves (*Arch. Pharm.* 1977, *310*, 910; *Chem. Abstr.* 1978, *88*, 101548 g); salvigenin, 6-methoxygenkwanin, quercetin, chrysoeriol, luteolin, apigenin, eriodictyol and taxifolin from leaves (*Planta Med.* 1978, *31*, 308).

C. aromaticus Benth.; see *C. amboinicus* Lour.

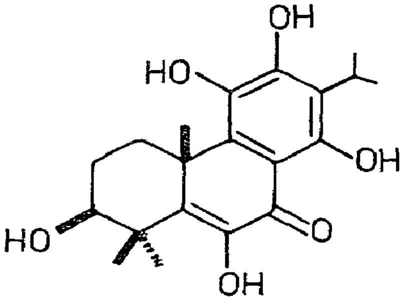
C. barbatus (Andr.) Benth.; see *C. forskohlii* (Willd.) Briq.

C. caninus (Roth) . atke syn. *C. spicatus* Benth., *Plectranthus caninus* Roth

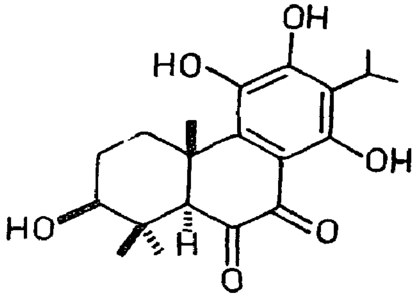
Two new pigments - coleon S and coleon T - isolated from leaves and stems and their structures determined (*Helv. Chim. Acta* 1977, *60*, 1443).

Distribution : Rocky dry hills of South Deccan Peninsula.

NEW COMPOUNDS



Coleon S



Coleon T

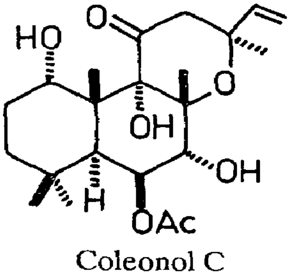
C. forskohlii (Willd.) Briq. syn. *C. barbatus* (Andr.) Benth.

Essential oil showed antimicrobial activity (*Rev. Fac. Farm. Odontol. Araraquara* 1972, *6*, 19; *Chem. Abstr.* 1973, *78*, 151549 x).

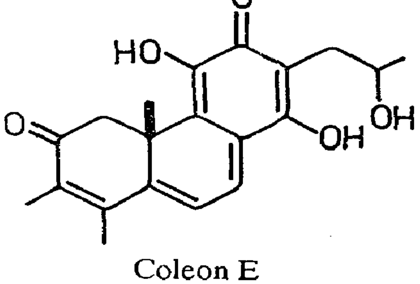
A new diterpenoid methylenequinone - coleon E - isolated from leaves and its structure elucidated (*Helv. Chim. Acta* 1972, *55*, 1994); a new diterpenoid - barbatusin - isolated from leaves and its crystal structure determined (*J. Am. Chem. Soc.* 1973, *95*, 598; *Tetrahedron* 1977, *33*, 1457); coleon F from leaves characterised (*Helv. Chim. Acta* 1973, *56*, 1129); crystal structure of cyclobutatusin isolated from leaves (*J. Am. Chem. Soc.* 1974, *96*, 580; *Tetrahedron* 1977, *33*, 1457); three new labdane diterpenoids (I,II and III) isolated from roots and their stereostructures determined (*Tetrahedron Lett.* 1977, 1669); 3β-hydroxy-3-deoxybarbatusin isolated and characterised (*Tetrahedron* 1977, *33*, 1457); isolation and crystal structure of coleonol (*Indian J. Chem.* 1977, *15*B, 880); three new diterpenes - coleonol B, coleonol C and deoxycoleonol - isolated from roots; isomeric coleonols B and C shown to be 6β-acetoxy-8, 13-epoxy-1,7,9α-trihydroxylabd-14-en-11-one and deoxycoleonol characterised as 7α-acetoxy-8,13-epoxy-1α,6β-dihydroxylabd-14-en-11-one (*Indian J. Chem.* 1978, *16*B, 341); another diterpene - coleosol - isolated and characterised (*Indian J. Chem.* 1978, *16*B, 1055).

Distribution : Himalayas from Garhwal to Nepal ascending to 2500 m, Parasnath Hills in Bihar and hills of Deccan peninsula.

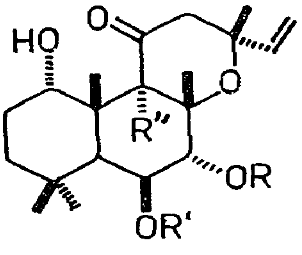
NEW COMPOUNDS



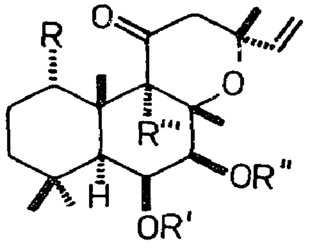
Coleonol C



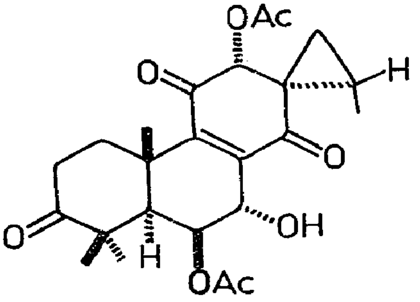
Coleon E



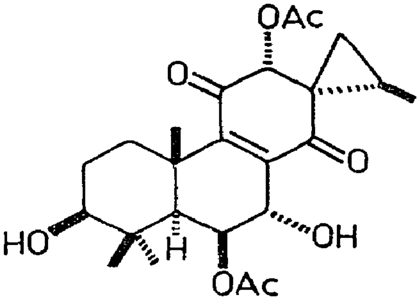
Coleonol
R = Ac, R′ = H, R″ = OH
Coleonol B
R = H, R′ = Ac, R″ = OH
Deoxycoleonol
R = Ac, R′,R″ = H



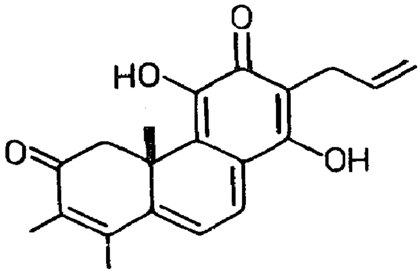
I
R,R′,R‴ = H, R″ = Ac
II
R,R‴ = OH, R′ = H, R″ = Ac
III
R,R‴ = OH, R′ = Ac, R″ = H



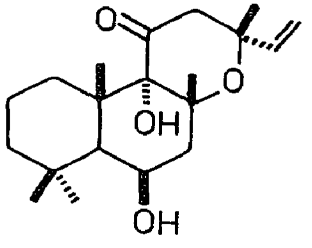
Barbatusin



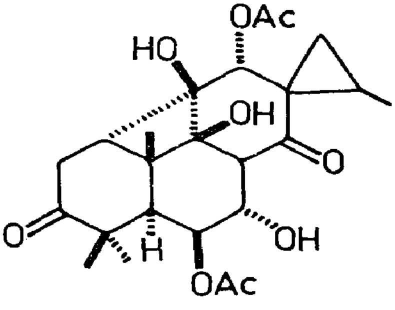
3β-Hydroxy-3-deoxybarbatusin



Coleon F



Coleosol



Cyclobutatusin

BIOLOGICAL ACTIVITY

Coleonol showed hypotensive and spasmolytic activities (*Indian J. Chem.* 1977, *15*B, 880); barbatusin showed inhibitory activity at 200 and 400 mg/kg against Lewis lung carcinoma and lymphocytic leukaemia P388 respectively in mice (*Tetrahedron* 1977, *33*, 1457); diterpenoids(I, II and III) showed blood pressure lowering and cardioactive properties (*Tetrahedron Lett.* 1977, 1669).

C. spicatus Benth.; see *C. caninus* (Roth) Vatke

COLOCASIA (Araceae)

C. fornicata Kunth; see *Alocasia fornicata* (Roxb.) Schott

COMMELINA (Commelinaceae)

C. benghalensis L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 74).

n-Octacosanol, n-triacontanol, n-dotriacontanol, stigmasterol, β-sitosterol and campesterol isolated (*J. Res. Indian Med.* 1975, *10*, 79).

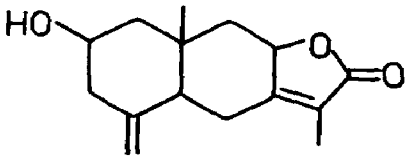
COMMIPHORA (Burseraceae)

C. mukul (Hook. ex Stocks) Engl.; see *C. wightii* (Arnott) Bhandari

C. myrrha (Nees) Engl. syn. *Balsamodendron myrrha* T. Nees (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 75).

Isolinalyl acetate, 3-epilupenyl acetate, lupeone, 3-epi-α-amyrin,α-amyrone and β-eudesmol acetate isolated from Arabian plant (*Chim. Ind.* 1972, *54*, 424; *Chem. Abstr.* 1973, *78*, 13745 g); a new sesquiterpene alcohol - commiferin, mp. 170° - isolated (*Chim. Ind.* 1972, *54*, 525; *Chem. Abstr.* 1972, *77*, 111467 s).

NEW COMPOUNDS

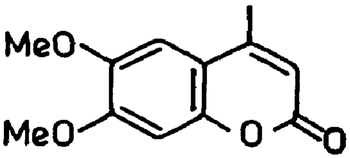


Commiferin

C. stocksiana (Engl.) Engl. syn. *Balsamodendron pubescens* Stocks (non *C. pubescens* (W. & A.) Engl. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 75).

β-Sitosterol, cedrelone and siderin, which was characterised as 6,7-dimethoxy-4-methylcoumarin,from roots; synthesis of siderin (*Proc. Indian Acad. Sci.* 1979, *88*A, 185).

NEW COMPOUNDS



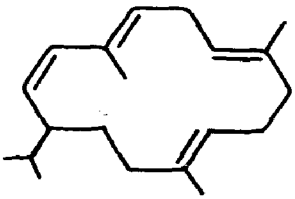
Siderin

C. wightii (Arnott) Bhandari syn. *C. mukul* (Hook. ex Stocks) Engl., *Balsamodendron mukul* Hook. ex Stocks (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 119).

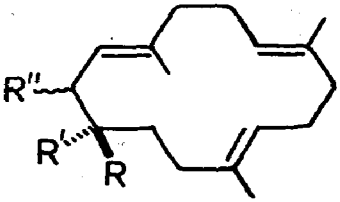
Alcoholic extract, a terpenoid and a steroid fraction showed significant hypolipidaemic activity, steroid fraction being the most potent (*Indian J. Med. Res.* 1970, *58*, 394); crude gum and its petroleum ether extract caused significant decrease in mean serum cholesterol level (*J. Res. Indian Med.* 1973, *8*, 131); gum fraction-A significantly lowered serum triglycerides (*Indian J. Med. Res.* 1971, *59*, 1621); a crystalline steroidal fraction inhibited full development of primary lesion in adjuvant arthritis and also reduced severity of secondary lesions (*Indian J. Med. Res.* 1972, *60*, 929).

Monocyclic diterpenes - α-camphorene and cembrene - isolated from resin; allylcembrol isolated from plant and characterised as 2-hydroxy-4,8,12-trimethyl-1-isopropyl-3,7,11-cyclodecatriene (*Arch. Pharm.* 1972, *305*, 468; *Chem. Abstr.* 1972, *77*, 111554 t); cholesterol, 4,17(20)-trans-pregnadien-3,16-dione, 4,17(20)-cis-pregnadien-3,16-dione and three new sterols - guggulsterols I,II,III - isolated from gum resin (*Tetrahedron* 1972, *28*, 2341); cembrene A isolated from resin and characterised (*Tetrahedron* 1973, *29*, 341); absolute structure of mukulol (allylcembrol) (*Tetrahedron* 1973, *29*, 341; *ibid.* 1976, *32*, 1437); isolation and structure elucidation of two aliphatic tetrols - octadecan-1,2,3,4-tetrol and eicosan - 1,2, 3,4-tetrol - from gum resin (*Tetrahedron* 1973, *29*, 1595).

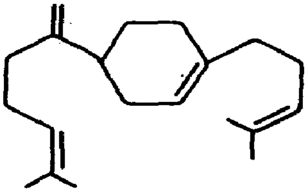
NEW COMPOUNDS



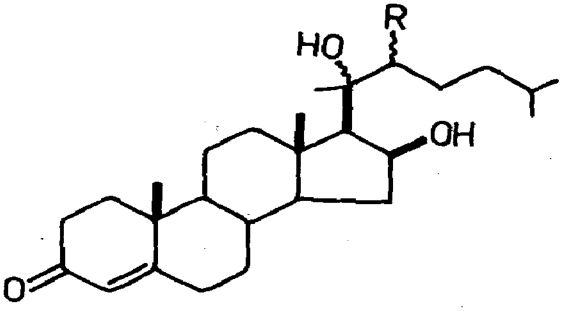
Cembrene



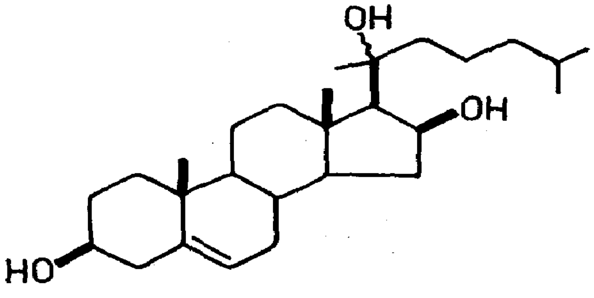
Cembrene A
R = CMe=CH_2, R',R'' = H
Mukulol
R = H, R' = $CHMe_2$, R'' = OH



α-Camphorene



Guggulsterol I
R = OH
Guggulsterol III
R = H



Guggulsterol II

BIOLOGICAL ACTIVITY

A steroid showed significant anti-inflammatory activity in rat paw oedema produced by carrageenin (*Indian J. Exp. Biol.* 1971, *9*, 403); a crystalline steroidal fraction when given i.p. at 1 or 5 mg/100g inhibited development of primary inflammation induced in rats by Freund's adjuvant and reduced severity of secondary inflammation; its effect against primary inflammation was less than that of hydrocortisone but it was more effective in reducing severity of secondary lesions (*Indian J. Med. Res.* 1972, *60*, 929); oleoresin (2 and 20 mg/100 g, p.o.) decreased weights of uterus, ovaries and cervix in female rats whereas glycogen and sialic acid levels in these organs increased. It was useful as an antifertility agent (*Indian J. Exp. Biol.* 1978, *16*, 1021).

CONNARUS (Connaraceae)

C. monocarpus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 119).

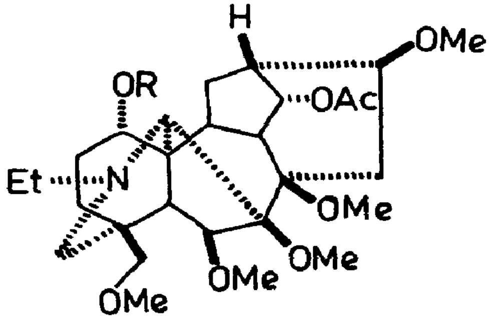
Rapanone, lycopene, leucopelargonidin, hentriacontane and β-sitosterol isolated from fruits (*Indian J. Chem.* 1976, *14*B, 475).

CONSOLIDA (Ranunculaceae)

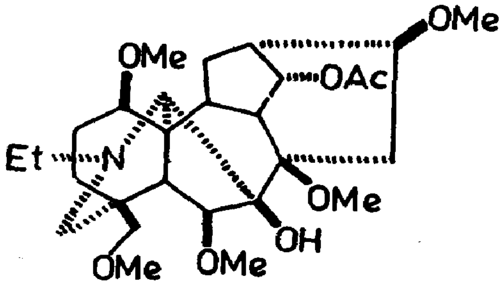
C. ambiqua (L.) Ball. & Heywood syn. *Delphinium ajacis* auct. (non L.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 120).

Delcosine, acetyldelcosine and delsoline isolated from seeds (*Proc. Okla. Acad. Sci.* 1973, *53*, 92; *Chem. Abstr.* 1973, *79*, 137325 k); in addition, dimethylacetyldelcosine and trimethylacetyldelcosine isolated (*Recent Dev. Mass Spectrom. Biochem. Med.* [Proc. Int. Symp. 4th] 1977, 429 (pub. 1978); *Chem. Abstr.* 1978, *89*, 176315 h); two new diterpenoid alkaloids - ambiguine and dihydroajaconine - isolated and characterised (*Heterocycles* 1978, *9*, 1241); isolation and structure of two new diterpenoid alkaloids - ajacusine and ajadine (*Heterocycles* 1978, *9*, 463).

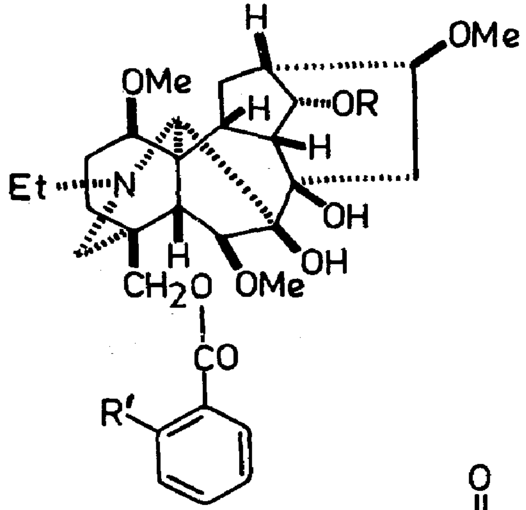
NEW COMPOUNDS

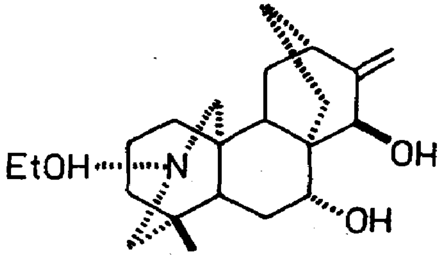


Dimethylacetyldelcosine
R = H
Trimethylacetyldelcosine
R = Me



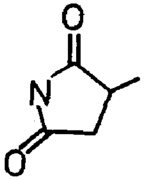
Ambiguine





Dihydroajaconine

Ajacusine
R = COPh, R' =



Ajadine
R = Ac, R' = NHAc

CONVOLVULUS (Convolvulaceae)

C. arvensis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 121).

α-Amyrin, campesterol, stigmasterol, β-sitosterol, n-alkanes and n-alkanols isolated from aerial parts (*J. Pharm. Sci.* 1973, *62*, 678).

C. microphyllus Sieb. ex Spreng. syn. *C. pluricaulis* Choisy
P.- Porprang, Dodak.

Alcoholic extract potentiated barbiturate hypnosis in rats (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 132,136).

6-Methoxy-7-hydroxycoumarin, glucose, maltose and β-sitosterol isolated (*J. Indian Chem. Soc.* 1969, *46*, 759); kaempferol, kaempferol-3-glucoside and 3,4-dihydroxycinnamic acid along with glucose, rhamnose, sucrose and starch isolated; chloride content of plant 0.76% (*Planta Med.* 1978, *34*, 222); n-hexacosanol, n-octacosanol, n-triacontanol and n-dotriacontanol, β-and ε-sitosterols isolated (*Z. Naturforsch.* 1978, *33*B, 249; *Chem. Abstr.* 1978, *88*, 133284 g).
Distribution : Plains of north India and Bihar

C. pluricaulis Choisy; see *C. microphyllus* Sieb. ex Spreng.

CONYZA (Asteraceae)

C. aegyptiaca Ait.

β-Amyrin and its acetate, hexacosanol, octacosanol, tetracosanol and stigmasterol, campesterol and cholesterol isolated (*Fitoterapia* 1978, *49*, 51); quercetin and quercetin-7-arabinoside isolated (*Pharmazie* 1979, *34*, 112; *Chem. Abstr.* 1979, *91*, 35695 m).

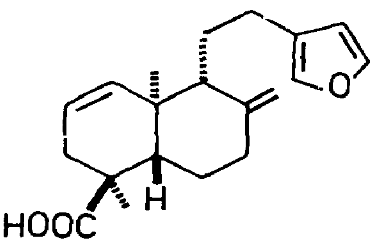
Distribution : Western Himalayas, Garhwal and Kumaon ascending upto 1500 m.

C. stricta Willd.

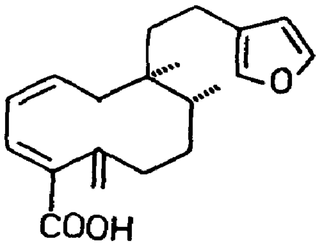
A new labdane diterpene acid - conyzic acid - isolated and structure determined (*Indian J. Chem.* 1975, *13*, 504); a new flavone - conyzatin - characterised as 5,7-dihydroxy- 3,8,3′,4′,5′-pentamethoxyflavone along with 5,7-dihydroxy-3,8,4′-trimethoxyflavone isolated (*Phytochemistry* 1977, *16*, 1455); a diterpene acid - strictic acid - isolated and its structure elucidated (*Phytochemistry* 1979, *18*, 494).

Distribution : Himalayas from Kashmir eastwards ascending to 1500 m, Meghalaya alt. 600-1800 m, Parasnath Hills in Bihar and Western Ghats.

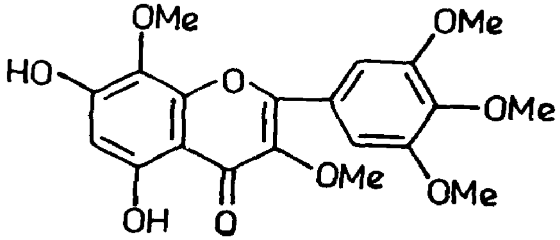
NEW COMPOUNDS



Conyzic acid



Strictic acid



Conyzatin

CORCHORUS (Tiliaceae)

C. acutangulus Lam.; see *C. aestuans* L.

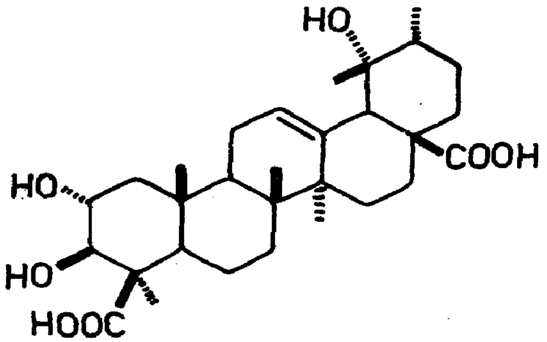
C. aestuans L. syn. *C. acutangulus* Lam. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 121).

β-Sitosterol and ceryl alcohol isolated from seed fat (*Indian J. Chem.* 1974, *12*, 780); sucrose, raffinose, stachyose and verbascose isolated from seeds (*Indian J. Pharm.* 1970, *32*, 17).

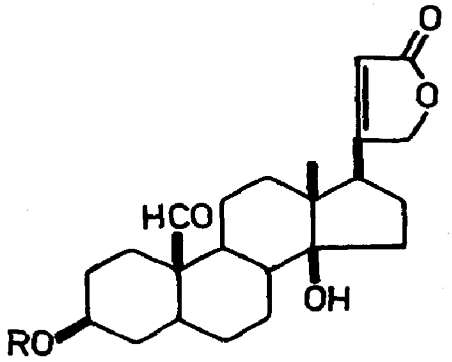
C. capsularis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 121).

Sucrose, raffinose, stachyose and verbascose isolated from seeds (*Indian J. Pharm.* 1970, *32*, 17); erysimoside isolated from seeds (*Indian J. Pharm.* 1971, *33*, 58); a new terpenoid - corosin, mp. 292° - along with β-sitosterol isolated from roots and its structure elucidated (*Pakistan J. Sci. Ind. Res.* 1971, *14*, 49; *Chem. Abstr.* 1971, *75*, 106046 h; *Z. Naturforsch.* 1974, *29C*, 209; *Chem. Abstr.* 1974, *81*, 74854 a); pectin, potassium chloride, wax, mp. 85°, fructose and galactose from bark (*Bangladesh J. Biol. Agric. Sci.* 1972, *1*, 64; *Chem. Abstr.* 1973, *78*, 26523 h); a new glycoside isolated from seeds and characterised as glucopyranosyl(1→3)-β-D-glucopyranosyl(1→4)-β-D-boivinopyranosyl(1→3)-strophanthidin (I) (*Indian J. Chem.* 1972, *10*, 479); a new glycoside - corchoside C - isolated from seeds along with strophanthidin, glycoside A and corchoside B; corchoside C indicated to be ribose glycoside of strophanthidin (*Bangladesh J. Sci. Ind. Res.* 1978, *13*, 127; *Chem. Abstr.* 1979, *90*, 148453 d).

NEW COMPOUNDS



Corosin



I

R = Boivinose(4→1)Glu(3→1)Glu

C. fascicularis Lam. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 77).

β-Sitosterol and betulinic acid isolated (*Indian J. Appl. Chem.* 1971, *34*, 237; *Chem. Abstr.* 1972, *77*, 111495 z); a new flavonoid glycoside isolated (*Indian J. Exp. Biol.* 1973, *11*, 248).

BIOLOGICAL ACTIVITY

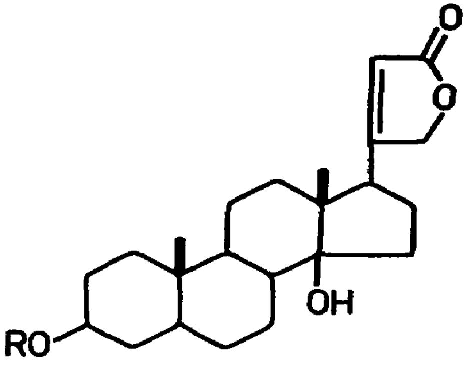
Flavonoid glycoside was spasmolytic to guinea pig ileum smooth muscle against acetylcholine, bradykinin and histamine - induced contractions (*Indian J. Exp. Biol.* 1973, *11*, 248).

C. olitorius L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 122).

Corchoroside A isolated from seeds (*Tr. Vses. Nauch.-Issled. Inst. Lek. Aromat. Rast.* 1969, *15*, 618; *Chem. Abstr.* 1971, *75*, 67424 h; *Curr. Sci.* 1973, *42*, 731); a cardiac glycoside - olitoriside - isolated from seeds (*Khim. Prir. Soedin.* 1970, *6*, 702; *Chem. Abstr.* 1971, *74*, 84004 t; *Khim. Prir. Soedin.* 1972, *8*, 81; *Chem. Abstr.* 1972, *77*, 85668 m; *Khim. Prir. Soedin.* 1975, *11*, 525; *Chem. Abstr.* 1975, *83*, 203758 q); corosin and β-sitosterol isolated from roots (*Pakistan J. Sci. Ind. Res.* 1971, *14*, 49; *Chem. Abstr.* 1971, *75*, 106046 h; *Z. Naturforsch.* 1974, *29C*, 209; *Chem. Abstr.* 1974, *81*, 74854 a); strophanthidin, strophanthidol, helveticoside and olitorin isolated from seeds (*Curr. Sci.* 1973, *42*, 731); new glycosides - eoroloside, mp. 237°

and deglucocoroloside - isolated along with erysimoside from roots and whole plant and characterised (*Tezisy Dokl. Vses. Simp. Bioorg. Khim.* 1975, 10; *Chem. Abstr.* 1976, *85*, 108934 b; *Khim. Prir. Soedin.* 1975, *11*, 525; *Chem. Abstr.* 1975, *83*, 203758 q).

NEW COMPOUNDS



Coroloside
R = 2,6-Dideoxyxyl(4→1)Glu
Deglucocoroloside
R = 2,6-Dideoxyxylose

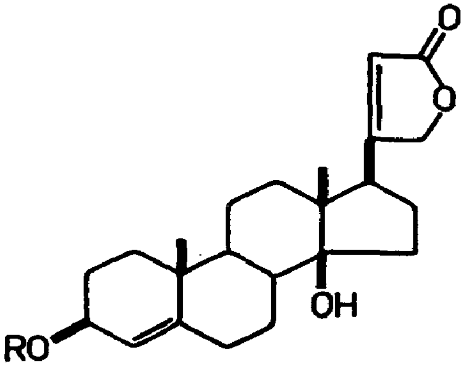
BIOLOGICAL ACTIVITY

Olitoriside (0.01 mg/kg, i.v.) when given 10 min before pituitrin (2 units/kg, i.v.), potentiated effect of latter on vascular tonus in dogs (*Elektron. Khim. Kardiol.* 1976, *9*, 154; *Chem. Abstr.* 1978, *88*, 146244 w).

C. trilocularis L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 77).

New cardenolide - trilocularin - and corchoroside B isolated from seeds and structure of former elucidated as 3-O-β-D-boivinosidocanarigenin (*Phytochemistry* 1975, *14*, 533).

NEW COMPOUNDS



Trilocularin
R = Boivinose
Corchoroside B
R = Rha

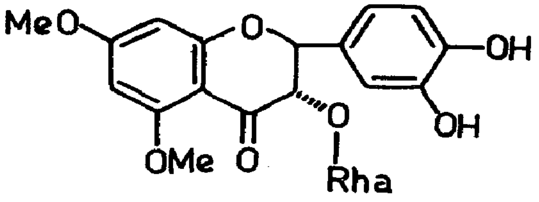
CORDIA (Boraginaceae)

C. angustifolia Roxb.; see *C. gharaf* (Forsk.) Ehrenb. ex Asch.

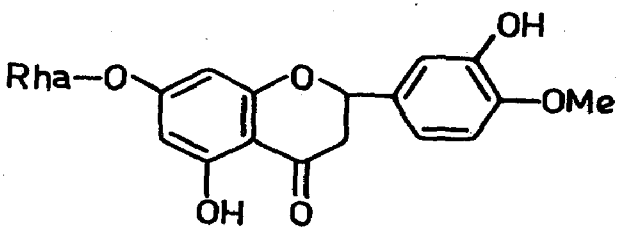
C. dichotoma Forst.f. syn. *C. obliqua* Willd., *C. latifolia* Roxb., *C. myxa* Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 77).

5,7-Dimethoxytaxifolin-3-O-α-L-rhamnopyranoside (I) isolated from roots and characterised (*Indian J. Chem.* 1977, *15B*, 760); β-sitosterol from roots (*Vijnana Parishad Anusandhan Patrika* 1977, *20*, 153; *Chem. Abstr.* 1977, *87*, 197349 w); fruit kernels contained protein (31.5) and oil (46.3%); mixture of palmitic (15.85), stearic (6.5), arachidic (1.85), behenic (0.95), oleic and linoleic acids (67.65) and other fatty acids (7.47%) also found in kernels (*Curr. Sci.* 1977, *46*, 511); hesperetin-7-rhamnoside obtained from roots (*Phytochemistry* 1978, *17*, 334); lup-20(29)-ene-3-O-β-D-maltoside (II) isolated from roots and its structure elucidated (*Phytochemistry* 1978, *17*, 1005); new 3′,5-dihydroxy-4′- methoxyflavanone-7-O-α-L-rhamnopyranoside (III), mp. 80°, allantoin and β-sitosterol isolated from stem bark (*Planta Med.* 1979, *36*, 191); taxifolin-3-rhamnoside isolated from seeds (*Indian Drugs* 1979, *16*, 105).

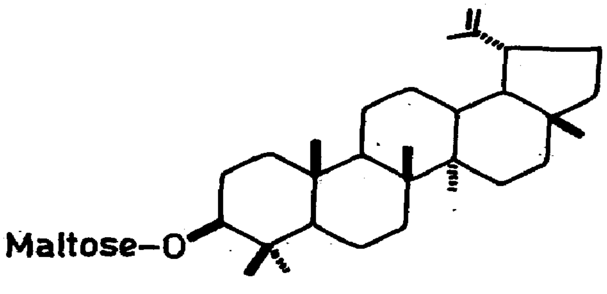
NEW COMPOUNDS



I



III



II

C. gharaf (Forsk.) Ehrenb. ex Asch. syn. *C. rothii* Roem. & Schult., *C. angustifolia* Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 77).

Sitosterol from stem (*Indian J. Chem.* 1977, *15B*, 291); β-amyrin, β-sitosterol and n-hentriacontane from unsaponifiable fraction of fruits (*J. Indian Chem. Soc.* 1978, *55*, 419).

C. latifolia Roxb.; see *C. dichotoma* Forst. f.

C. myxa Roxb.; see *C. dichotoma* Forst. f.

C. obliqua Willd.; see *C. dichotoma* Forst. f.

C. rothii Roem. & Schult.; see *C. gharaf* (Forsk.) Ehrenb. ex Asch.

CORIANDRUM (Apiaceae)

C. sativum L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 122).

β-Sitosterol and a substance, mp. 288°, isolated (*Indian J. Chem.* 1974, *12*, 226); chlorogenic and caffeic acids, rutin, umbelliferone and scopoletin isolated (*Khim. Prir. Soedin.* 1974, *10*, 94; *Chem. Abstr.* 1974, *81*, 60810 w); detection of α-pinene, limonene, β-phellandrene, 1,8-cineole, linalool, borneol, β-caryophyllene, citronellol, geraniol, thymol, linalyl acetate, geranyl acetate, caryophyllene oxide, elemol and methylheptenone in seed oil by TLC and GLC; triacontane, triacontanol, β-sitosterol, tricosanol, psoralen, angelicin and coriandrinol (β-sitosterol glucoside) isolated (*Indian Perfum.* 1977, *21*, 86; *Chem. Abstr.* 1978, *88*, 177009 c).

CORNUS (Cornaceae)

C. capitata Wall.; see *Benthamidia capitata* (Wall.) Hara

CORTADERIA (Poaceae)

C. selloana (Schult.) Aschers. & Graebn.

Seed wax consisted of C_{27}, C_{29} and C_{31} hydrocarbons (26.0), esters derived from C_{20} and C_{24} acids and C_{22}, C_{24} and C_{26} alkanols (27.0) and sitosterol (39.0%) (*Phytochemistry* 1978, *17*, 556).

Distribution : Native of South America, introduced into Indian gardens.

CORYDALIS (Fumariaceae)

C. cornuta Royle

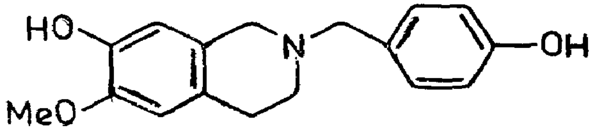
(-)Stylopine, protopine and (-)coreximine isolated from leaves and stems (*Indian J. Chem.* 1977, *15B*, 389).

Distribution : Kashmir to Kumaon, alt. 2200-3200 m.

C. gortschakovii Schrenk., (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 123).

Structure of corgoine elucidated (*Khim. Prir. Soedin.* 1970, *6*, 638; *Chem. Abstr.* 1971, *74*, 54046 r); isocorydine, protopine sendaverine, d-bicuculline and l-adlumine isolated (*Khim. Prir. Soedin.* 1970, *6*, 438; *Chem. Abstr.* 1970, *73*, 127738 j).

NEW COMPOUNDS

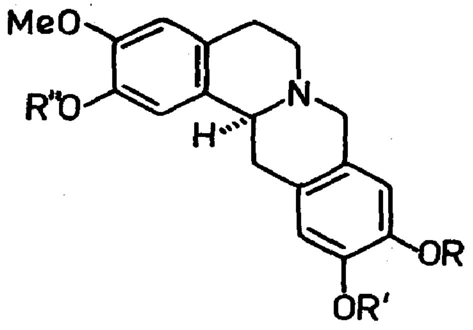


Corgoine

C. govaniana Wall. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 78).

Three new tetrahydroprotoberberine alkaloids - corygovanine, (-)govadine and govanine - along with bicuculline isolated from leaves and their structures elucidated (*Indian J. Chem.* 1976, *14*B, 216, 844).

NEW COMPOUNDS



Corygovanine
R,R' = $-CH_2-$, R'' = Me
(-)Govadine
R,R'' = H, R' = Me
Govanine
R,R' = Me, R'' = H

BIOLOGICAL ACTIVITY

Corydine, thalicmidine, O-methylisocorydine and isocorydine methiodides (0.5-1.0 mg/kg, i.v.) decreased blood pressure in anaesthetised dogs, blocked transmission of nerve impulses through superior cervical ganglia of cats and in large doses blocked neuromuscular transmission in frogs and rabbits (*Farmakol. Alkaloidov Serdechnykh Glikozidov* 1971, 141; *Chem. Abstr.* 1973, *78*, 79633 a); corydine hydrochloride and isocorydinehydrochloride (10-15 mg/kg, i.p.) inhibited conditioned escape reflexes in rats and at higher doses (15-100 mg/kg) caused salivation and lacrimation in cats along with loss of coordination, catalepsy and other nervous disturbances. It had same effects on emotional autonomic behaviour of dogs when given i.v. at 5-15 mg/kg (*Farmakol. Alkaloidov Serdechnykh Glikozidov* 1971, 127; *Chem. Abstr.* 1973, *78*, 79630 x); corydine or isocorydine (30-60 mg/kg) administered s.c. into mice increased convulsant effects of corazoll (*Farmakol. Alkaloidov Ikh Proizuod.* 1972, 118; *Chem. Abstr.* 1974, *80*, 91212 m).

Bicuculline (5 mg/kg, s.c.) produced convulsions and decreased spinal cord acetylcholine content in frogs 10 minutes after administration (*Brit. J. Pharmacol.* 1972, *45*, 173).

C. longipes DC. syn. C. sibirica auct.[non (L.) Pers]. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 123).

Crystal structure of sibiricine (*Khim. Prir. Soedin.* 1978, *14*, 752; *Chem. Abstr.* 1979, *91*, 20829 j).

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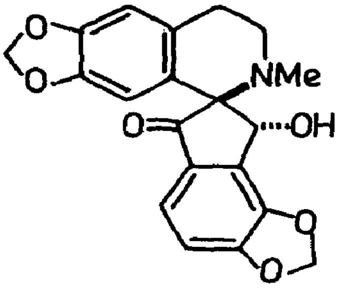

Sibiricine

C. ophiocarpa Hook.f. & Thoms. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 123).

Two new alkaloids - 13β-hydroxystylopine and carpoxidine - together with known alkaloids isolated and characterised (*Yakugaku Zasshi* 1978, *98*, 1243; *Chem. Abstr.* 1979, *90*, 36290 s); α-allocryptopine, protopine, coptisine, berberine, (-)ophiocarpine, (-)stylopine, sanguinarine isolated (*Yakugaku Zasshi* 1978, *98*, 1658; *Chem. Abstr.* 1979, *90*. 135084 j; *Planta Med.* 1979, *36*, 213); noroxyhydrastinine, (-)isocorypalmine, (-)cheilanthifoline, dehydrocheilanthifoline chloride, corypalline, dehydrocorypalline chloride and choline chloride isolated (*Yakugaku Zasshi* 1978, *98*, 1658; *Chem. Abstr.* 1979, *90*, 135084 j); (-)canadine, chelerythrine, corysamine, (-)corypalmine and (-)ophiocarpine N-oxide isolated (*Planta Med.* 1979, *36*, 213).

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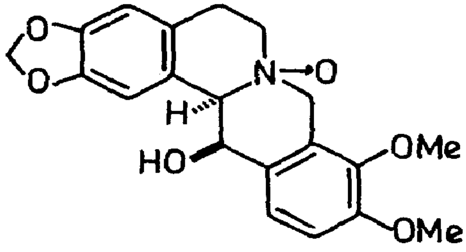
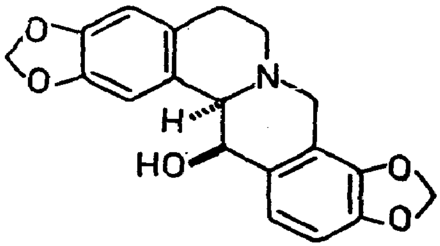


Carpoxidine



13β-Hydroxystylopine

C. ramosa Wall.; see *C. vaginans* Royle

C. sibirica Pers.; see *C. longipes* DC.

C. stewartii Fedde (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 123).

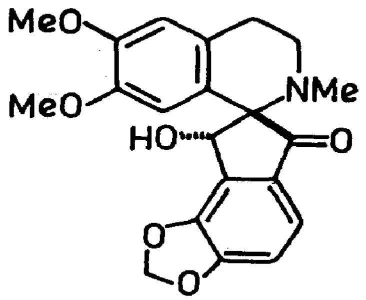
Ginnol, protopine, d-tetrahydrocoptisine, domesticine, isoboldine and coptisine isolated (*Phytochemistry* 1972, *11*, 2644).

C. vaginans Royle syn. *C. ramosa* Wall. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 78).

d-Ochrobirine isolated (*Khim. Prir. Soedin.* 1974, *10*, 813; *Chem. Abstr.* 1975, *82*, 121675 a); sanguinarine and protopine isolated (*Khim. Prir. Soedin.* 1974, *10*, 813; *Chem. Abstr.* 1975, *82*,

121675 a; *Khim. Prir. Soedin.* 1978, *14*, 592; *Chem. Abstr.* 1979, *90*, 69088 k); d-corydaine and 1-O-methylcorpaine isolated (*Khim. Prir. Soedin.* 1976, *12*, 123; *Chem. Abstr.* 1976, *85*, 59576 a).

NEW COMPOUNDS



1-O-Methylcorpaine

COSMOS (Asteraceae)

C. bininnatus Cav.

Eng. - Cosmos.

Chrysoeriol-7-glucuronide and luteolin-7-glucuronide isolated from flowers (*Planta Med.* 1976, *30*, 349).

Distribution : Native of tropical America; grown in Indian gardens as ornamental.

COSTUS (Zingiberaceae)

C. megalobractea K. Schum.

Diosgenin content of two-year old plant rhizomes 0.42, stems 0.12%; leaves contained no diosgenin and roots had traces (*Indian J. Pharm. Sci.* 1978, *40*, 127).

Distribution : Native of tropical Africa, introduced into India at National Botanical Research Institute, Lucknow.

C. speciosus (Koen. ex Retz.) Sm. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 78).

Chloroform extract of rhizomes found to be very potent ecbolic agent exerting its action on muscle cells of isolated estrinised uterus of rat (*J. Res. Indian Med.* 1971, *6*, 354). Total saponin mixture showed significant anti-inflammatory activity, significantly increased uterus weight of spayed rats and produced proliferative changes in uterus and vagina (*Indian J. Pharm.* 1972, *34*, 116); saponins showed oestrogenic activity in spayed rats, significantly increased uterine weight and uterine glycogen concentration and produced proliferative changes in uterus and vagina (*Indian J. Med. Res.* 1972, *60*, 287); saponin mixture showed spasmodic effect of varying degree on isolated ileum and isolated tracheal chain preparations (*J. Res. Indian Med.* 1974, *9*, 16); alkaloidal fraction from rhizomes showed papaverine-like smooth muscle relaxant, antispasmodic, cardiotonic, hydrocholeretic, diuretic and CNS depressant activities in laboratory animals (*J. Res. Indian Med.* 1973, *8*, 10).

Tigogenin and diosgenin from rhizomes and stems (*J. Inst. Chemists*, Calcutta 1970, *42*, 131; *Chem. Abstr.* 1971, *74*, 50513 t; *Lloydia* 1978, *41*, 640); saponin A, mp. 305°, saponin B, mp. 232°, saponin C, mp. 301° and β-sitosterol glucoside from rhizomes (*Indian J. Pharm.* 1972, *34*, 116); rhizomes contained diosgenin (2.6%) (*Indian J. Pharm.* 1977, *39*, 74); α-amyrin stearate, β-amyrin and lupeol palmitates from leaves (*Curr. Sci.* 1977, *46*, 261); effect of rhizome diameter (5.0 cm to 15.0 cm) on sapogenin content determined; thinnest group contained largest amount of sapogenin (2.7%) (*Indian Drugs* 1977, *15*, 14).

CONTINUS (Anacardiaceae)

C. coggygria Scop. syn. *Rhus continus* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 124).

Gallotannins and seven phenolic compounds identified in leaves by PC; phenolic compounds shown to be flavonoids formed from three aglycones: myricetin, quercetin and kaempferol with D-glucose, L-rhamnose and L-arabinose bound at 3-position (*Fenol'nye Soedin. Ikh Fiziol. Svoistva, Mater. Vses Simp. Fenol'nym Soedin.* 2nd 1971 (pub. 1973), 159; *Chem. Abstr.* 1974, *81*, 166329 m).

COUROUPITA (Lecythidaceae)

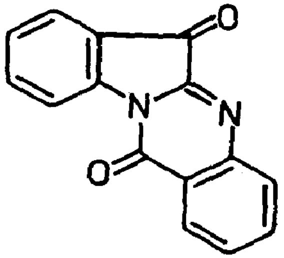
C. guianensis Aubl.

Eng. - Cannon-ball tree.

An alkaloid - couroupitine A - along with couropitine B, stigmasterol and campesterol isolated from fruits (*Tetrahedron Lett.* 1974, 609); revised structure of couroupitine A proposed; couroupitine B found identical with indirubin (*Tetrahedron Lett.* 1977, 2625).

Distribution : Grown in Indian gardens as ornamental.

NEW COMPOUNDS



Couroupitine A

CRATAEGUS (Rosaceae)

C. oxycantha L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 125).

Fraction of inflorescence extract containing hyperoside (27.2) and vitexin rhamnoside (10.6%) increased coronary blood flow by 57%, whereas fraction containing hyperoside (0.8)

and vitexin rhamnoside (20.4%) increased blood flow by only 15% (*Herba Pol.* 1973, *19*, 138; *Chem. Abstr.* 1974, *80*, 26 q).

CRATAEVA (Capparaceae)

C. adansonii DC. ssp. *odora* (Buch.-Ham.) Jacobs syn. *C. religiosa* sensu Hook.f. & Thoms. var. *roxburghii* (R. Br.) Hook.f. & Thoms. (excl. syn. *C. unilocularis*)

S. - Varuna; H. & B. - Barun, Barna; P. - Barna; Bo. - Vayavarna; Tam. - Maralingam; Tel. - Magalingam.

Kaempferol-3-glucoside detected as major constituent of plant (*Curr. Sci.* 1973, *42*, 248). Distribution : Almost throughout India, ascending to 700 m in hills, wild or planted.

C. nurvala Buch.-Ham. syn. *C. religiosa* sensu Hook f. & Thoms. var. *nurvala* (Buch.- Ham.) Hook.f. & Thoms. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 79).

Pharmacognostic studies of leaf (*J. Res. Indian Med.* 1971, *6*, 261); lauric, stearic, undecylic, oleic and linolenic acids from root bark (*Indian Oil Soap J.* 1972, *37*, 288; *Chem. Abstr.* 1973, *79*, 123627 y); a new triterpene alcohol - lupa-21,20(29)dien-3β-ol (I) - isolated from root bark (*Planta Med.* 1977, *32*, 214); ceryl alcohol, friedelin, betulinic acid and diosgenin from bark; cetyl alcohol, ceryl alcohol, triacontane, triacontanol, β-sitosterol and glucocapparin from fruits; seasonal variation found in diosgenin content (*Planta Med.* 1978, *34*, 223).

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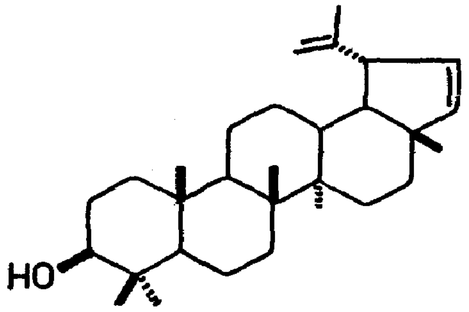


I

C. religiosa Hook.f. & Thoms. var. *roxburghii* (R. Br.) Hook.f. & Thoms.; see *C. adansonii* DC. ssp. *odora* (Buch.-Ham.) Jacobs

C. religiosa Hook.f. & Thoms.; see *C. nurvala* Buch.-Ham.

CRESSA (Convolvulaceae)

C. cretica L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 126).

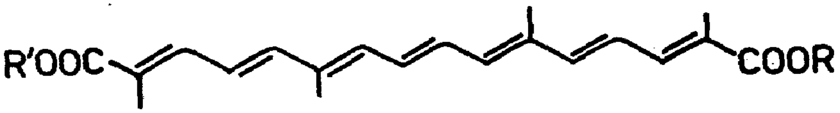
A quercetin glycoside detected (*J. Res. Indian Med.* 1974, *9*, 109).

CROCUS (Iridaceae)

C. sativus L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 80).

Carotenoid glycosides - crocin-1, crocin-2(β-monogentiobioside-β-D-monoglucoside ester of α-crocetin), crocin-3(β-monogentiobioside ester of α-crocetin) and crocin-4 (β-D- monoglucoside ester of monomethyl-α-crocetin) isolated (*Indian J. Chem.* 1975, *13*, 339); mono-β-D-gentiobiosyl and mono-β-D-glucosyl esters of crocetin isolated (*Helv. Chim. Acta* 1975, *58*, 2233); crocetin-di-(β-D-gentiobiosyl) ester (crocin), crocetin-(β-D-gentiobiosyl)-(β-D-glucosyl) ester and crocetin-di-(β-D-glucosyl) ester isolated (*Helv. Chim. Acta* 1975, *58*, 1608).

NEW COMPOUNDS



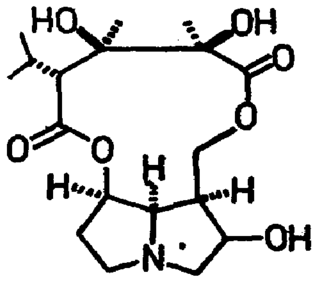
Crocin I
R,R' = Gentiobiose
Crocin 2
R = Gentiobiose, R' = Glu
Crocin 3
R = Gentiobiose, R' = H
Crocin 4
R = Glu, R' = Me

CROTALARIA (Papilionaceae)

C. albida Heyne ex Roth (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 83).

A new pyrrolizidine alkaloid - croalbidine, mp. 208° - isolated and shown to be diester of croalbinecine and trichodesmic acid (*Indian J. Chem.* 1973, *11*, 88).

NEW COMPOUNDS



Croalbidine

C. anagyroides H. B. & K. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 126).

Apiin isolated from stem bark which on hydrolysis yielded apigenin, glucose and apiose (*Phytochemistry* 1970, *9*, 258).

C. assamica Benth.

Monocrotaline isolated from seeds (*Chung-Hua I Hsueh Tsa Chih* 1973, 472; *Chem. Abstr.* 1975, *82*, 11176 f).

Distribution : Jayantia Hills in Meghalaya, alt. 1000-1600 m.

BIOLOGICAL ACTIVITY

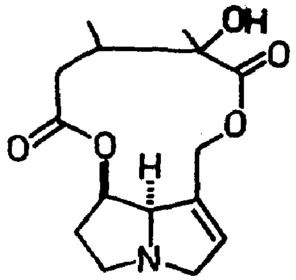
Monocrotaline inhibited growth of transplanted tumors in white mice. It was found more destructive to malignant than normal cells. It inhibited cell multiplication and growth by affecting protein synthesis and metabolism within cell. LD50 was 700 mg/kg in white mice. In large doses, hepatotoxicity was observed in dogs and mice (*Chung-Hua I Hsueh Tsa Chih* 1973, 472; *Chem. Abstr.* 1975, *82*, 11176 f).

C. barbata Grah. ex W. & A.

A new pyrrolizidine alkaloid - crobarbatine - isolated from seeds and its structure elucidated (*Experientia* 1973, *29*, 390).

Distribution : Travancore and the Nilgiris, ascending to 1800 m.

NEW COMPOUNDS



Crobarbatine

C. burhia Buch.-Ham. ex Benth. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 81).

Crotalarine isolated and its structure determined (*Pakistan J. Sci. Ind. Res.* 1973, *16*, 227; *Chem. Abstr.* 1974, *81*, 120836 w); croburhine, mp. 167° and a new acid - 2,3-dihydroxy-4-ethyl-2,3,4-trimethylglutaric acid - isolated (*Indian J. Chem.* 1975, *13*, 835); maximum growth and carotenoid content (13.5 mg/g dry wt.) observed in 8-week old tissue cultures; six rotenoids - elliptone, deguelin, toxicarol, rotenone, sumatrol and tephrosin - identified by TLC (*Planta Med.* 1979, *36*, 181).

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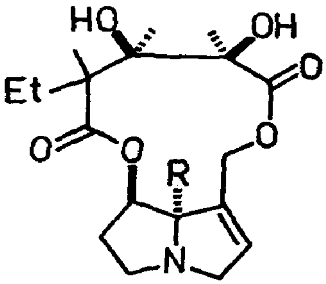


Crotalarine
R = H
Croburhine
R = Me

C. ferruginea Grah. ex Benth. syn. *C. ferruginea* Grah. ex Benth. var. *pilosissima* Miq., *C. lejoloba* Bartl.

Monocrotaline isolated (*J. Indian Chem. Soc.* 1974, *51*, 628).

Distribution : Nepal eastwards, ascending to 1800 m.

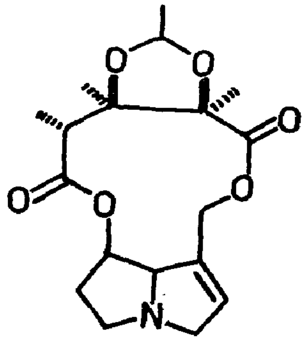
C. ferruginea Grah. ex Benth. var. *pilosissima* Miq.; see *C. ferruginea* Grah. ex Benth.

C. grahamiana W. & A. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 127).

Monocrotalinine found to be present in plant as N-oxide during flowering season after which plant contained monocrotaline and monocrotalinine as tertiary bases; structure of monocrotalinine established (*Indian J. Chem.* 1977, *15*B, 455).

Distribution : Tamil Nadu, Pulney Hills, alt. 1200 m.

NEW COMPOUNDS



Monocrotalinine

C. incana L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 127).

Integerrimine and usaramine isolated from seeds (*J. Indian Chem. Soc.* 1970, *47*, 667).

C. juncea L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 81).

Alcoholic extract showed only 50% antiovulatory activity even at 800 mg/kg in rabbits (*Indian J. Pharmacol.* 1973, *5*, 404); alcoholic extract also showed 83% antifertility activity at 300 mg/kg when administered from days 1 to 7 of pregnancy (*Indian J. Med. Res.* 1979, *70*, 517).

Apigenin-7-glucuronide and apigenin-7,4′-O-di-glucoside from seeds (*Phytochemistry* 1970, *9*, 2581); α-hydroxynorleucine isolated from seeds (*Phytochemistry* 1979, *18*, 320); structure elucidation studies on seed polysaccharide (galactomannan) (*Indian J. Chem.* 1979, *18*B, 59).

C. laburnifolia L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 128).

Anacrotine isolated from seeds identified as crotalaburnine (*J. Indian Chem. Soc.* 1971, *48*, 887);

BIOLOGICAL ACTIVITY

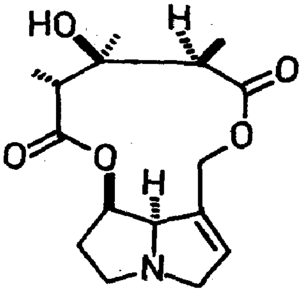
Crotalaburnine (10 mg/kg, s.c.) showed same degree of inhibition of carrageenin-induced oedema in rat as phenylbutazone (100 mg/kg, p.o.) Crotalaburnine, at half the dose of hydrocortisone, produced similar inhibition against cotton-pellet granuloma in rat (*Brit. J. Pharmacol.* 1974, *51*, 503).

C. lejoloba Bartl.; see *C. ferruginea* Grah. ex Benth.

C. madurensis W. & A. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 128).

Crispatine and fulvine isolated (*Lloydia* 1971, *34*, 455); a new pyrrolizidine alkaloid - cromadurine, mp. 242° - isolated from seeds (*Indian J. Chem.* 1975, *13*, 870); a diastereoisomer of cromadurine - isocromadurine - isolated (*Experientia* 1975, *31*, 878).

NEW COMPOUNDS

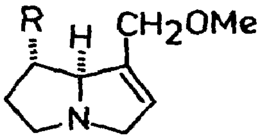


Cromadurine

C. medicaginea Lam. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 128).

Methoxysupinidine (1-methoxymethyl-1,2-dehydro-8α-pyrrolizidine) and methoxyheliotridine (7α-hydroxy-1-methoxymethyl-1,2-dehydro-8α-pyrrolizidine) isolated from seeds (*J. Indian Chem. Soc.* 1970, *47*, 741).

NEW COMPOUNDS



Methoxysupinidine
R = H
Methoxyheliotridine
R = OH

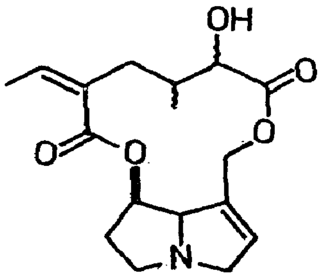
C. mucronata Desv.; see *C. pallida* Dryand. var. *pallida*

C. nana Baker; see *C. umbellata* Wight ex Wight & Arn.

C. pallida Dryand. var. *pallida* syn. *C. mucronata* Desv., *C. striata* DC. (excl. var. *laburnoides* Klotzsch), *C. saltiana* Andr. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 129).

Vitexin, vitexin-4'-O-xyloside and apigenin from leaves and stem bark (*Phytochemistry* 1970, *9*, 2581); chrysoeriol-7-rutinoside isolated from seeds (*Phytochemistry* 1971, *10*, 3312); a pyrrolizidine alkaloid - nilgirine - isolated and its structure elucidated (*Planta Med.* 1972, *21*, 435).

NEW COMPOUNDS



Nilgirine

C. paniculata Willd. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 129).

Quercetin-3-galactoside and vitexin-4'-O-xyloside from flowers (*Phytochemistry* 1970, *9*, 2581).

C. saltiana Andr.; see *C. pallida* Dryand. var. *pallida*

C. semperflorens Vent. var. *walkeri* (Arnott) Baker; see *C. walkeri* Arnott

C. striata DC.; see *C. pallida* Dryand. var. *pallida*

C. tetragona Roxb.

Integerrimine and trichodesmine isolated (*J. Indian Chem. Soc.* 1974, *51*, 628); 2-amino-5-hydroxyhexanoic acid from seeds (*Indian J. Pharm.* 1975, *37*, 96).

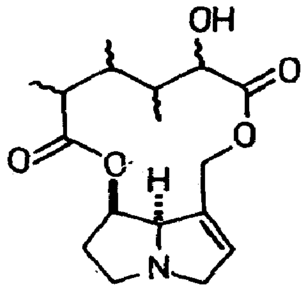
Distribution : Himalayas from Kumaon to Sikkim, ascending to 1200 m.

C. umbellata Wight ex Wight & Arn. syn. *C. nana* sensu Baker (non Burm.f.) p.p.

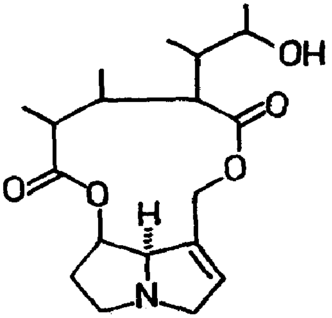
Isolation and crystal structure of antitumor alkaloid - monocrotaline (*Indian J. Chem.* 1978, *16*B, 1132; *K'o Hsueh T'ung Pao* 1978, *23*, 670; *Chem. Abstr.* 1979, *90*, 187191 m); new pyrrolizidine alkaloids cronaburmine and crotananine - isolated and characterised (*Indian J. Chem.* 1978, *16*B, 1132; *Phytochemistry* 1978, *17*, 2143).

Distribution : Western peninsular India.

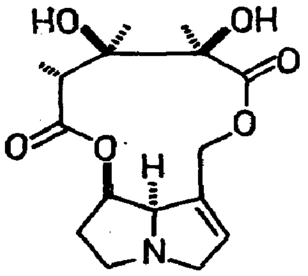
NEW COMPOUNDS



Crotananine



Cronaburmine

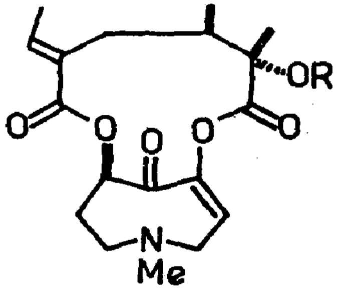


Monocrotaline

C. verrucosa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 131).

New secopyrrolizidine alkaloids - crotaverrine and O-acetyl-crotaverrine - isolated from seeds (*Phytochemistry* 1976, *15*, 1061).

NEW COMPOUNDS



Crotaverrine

R = H

O-Acetylcrotaverrine

R = Ac

C. walkeri Arnott syn. *C. semperflorens* Vent. var. *walkeri* (Arnott) Baker

Crotaverrine and its O-acetyl derivative isolated from seeds along with β-sitosterol (*Indian J. Chem.* 1976, *14*, 471).

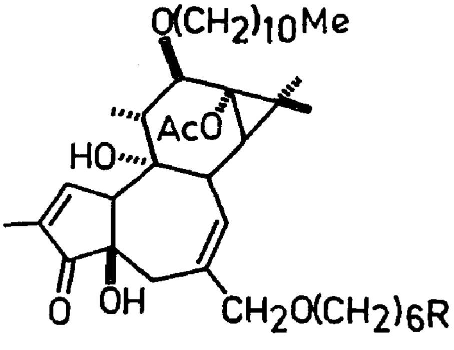
Distribution : South-west India.

CROTON (Euphorbiaceae)

C. bonplandianum Baill. syn. *C. sparsiflorus* Morong (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 131).

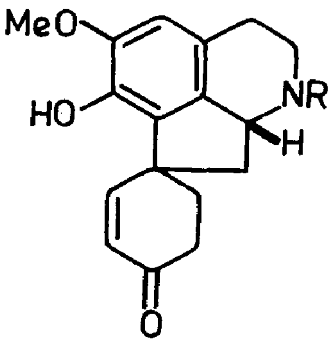
Crotsparine, N-methylcrotsparine, mp. 223°, N,O-dimethylcrotsparine, mp. 125° and two dihydroproaporphines - crotsparinine and N-methylcrotsparinine - isolated (*Phytochemistry* 1970, *9*, 2573); presence of rutin in leaves (*Phytochemistry* 1971, *10*, 2548); β-sitosterol and hydrocarbons found in plant (*Phytochemistry* 1971, *10*, 2247); a phorbol derivative (I) isolated from seeds (*Phytochemistry* 1976, *15*, 1070).

NEW COMPOUNDS



I

R = $(CH_2CH{=}CH)_3Et$

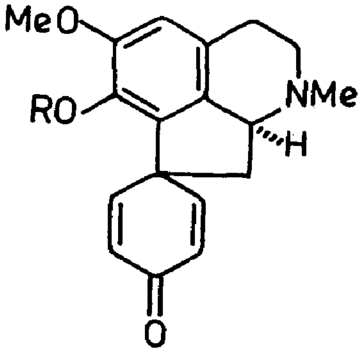


Crotsparinine

R = H

N-Methylcrotsparinine

R = Me



N-Methylcrotsparine

R = H

N,O-Dimethylcrotsparine

R = Me

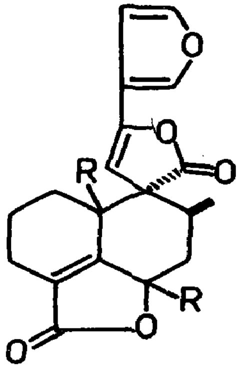
BIOLOGICAL ACTIVITY

Phorbol derivative (I) showed less irritant and carcinogenic activities as compared to 12-O-dodecanoylphorbol-13-acetate but it was easily converted into latter (*Phytochemistry* 1976, *15*, 1070).

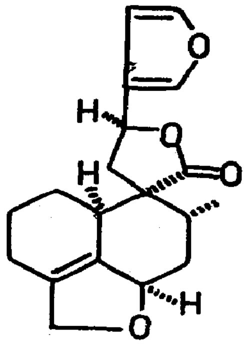
C. caudatus Geisel. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 131).

Isolation and absolute configuration of norditerpenes - crotocaudin and teucvidin; taraxerone, taraxerol and its acetate also isolated (*Tetrahedron* 1977, *33*, 2407); a new diterpene - isocrotocaudin - isolated from bark and its absolute structure determined (*Phytochemistry* 1978, *17*, 1777).

NEW COMPOUNDS



Crotocaudin
R = α-H
Isocrotocaudin
R = β-H



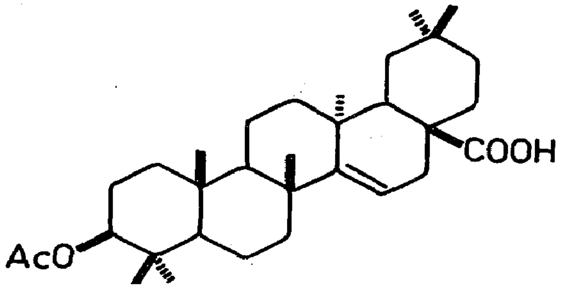
Teucvidin

C. oblongifolius Roxb.; see *C. roxburghii* Balak.

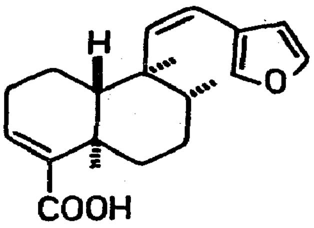
C. roxburghii Balak. syn. *C. oblongifolius* Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 131).

Ent-isopimara-7,15-diene, ent-isopimara-7,15-dien-19-ol and ent-isopimaradien-19-al isolated (*Indian J. Chem.* 1971, *9*, 613); acetylaleuritolic acid isolated and characterised as 3β-acetoxyolean-14(15)-en-28-oic acid (*Indian J. Chem.* 1971, *9*, 1028); flavonoids isolated from root bark, stem bark and wood, whose aglycone identified as quercetin and procyanidin (*Curr. Sci.* 1972, *41*, 839); a new diterpenoid acid - (-)11-dehydrohardwickiic acid - along with (-)hardwickiic acid isolated and characterised (*Phytochemistry* 1972, *11*, 1473).

NEW COMPOUNDS



Acetylaleuritolic acid



11-Dehydrohardwickiic acid

C. sparsiflorus Morong; see *C. bonplandianum* Baill.

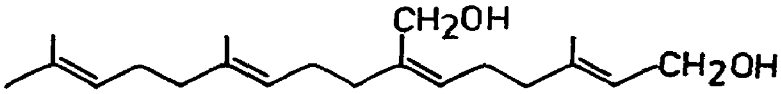
C. sublyratus Kurz

An acyclic diterpene alcohol isolated and characterised as (E,Z,E)7-hydroxymethyl-3,11,15-trimethyl-2,6,10,14-hexadecatetraen-1-ol (I) (*Chem. Pharm. Bull.* 1978, *26*, 3117); four furanoditerpenes [II (plaunol A), III,IV and V] isolated and their structures determined

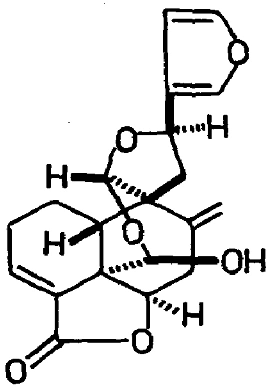
(*Tennen Yuki Kagobutsu Toronkai Koen Yoshishu* 1978, 528; *Chem. Abstr.* 1979, *90*, 152394 c); 18-hydroxygeranylgeraniol and diterpene lactones - plaunol A and plaunol B - isolated and their structures established by X-ray analysis (*Tetrahedron Lett.* 1979, 1117).

Distribution : Andaman and Nicobar Islands.

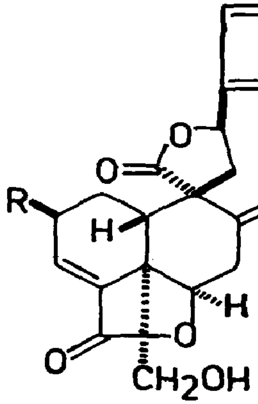
NEW COMPOUNDS



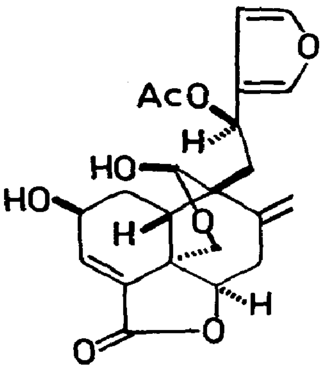
I



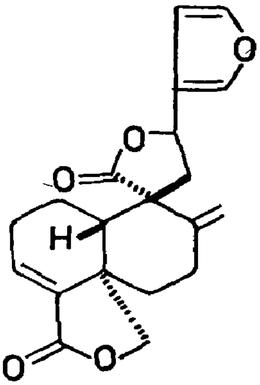
II
(Plaunol A)



III
R = OH
Plaunol B
R = H



IV



V

BIOLOGICAL ACTIVITY

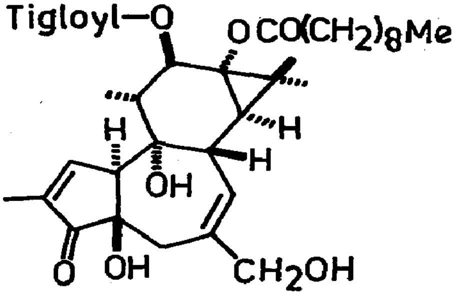
Acyclic diterpene alcohol (I) was found to have antipeptic ulcer activity (*Chem. Pharm. Bull.* 1978, *26*, 3117); furanoditerpenes II, III, IV and V inhibited ulcer in mice (*Tennen Yuki Kagobutsu Toronkai Koen Yoshishu* 1978, 528; *Chem. Abstr.* 1979, *90*, 152394 c); plaunol B showed 85% ulcer inhibition in rats at 10 mg/kg dose (*Tetrahedron Lett.* 1979, 1117).

C. tiglium L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 132).

Plant extract,used in folk medicine for treating cancer, showed activity against P-388 lymphocytic leukaemia in mice (*Science* 1976, *191*, 571).

β-Sitosterol from seeds (*Indian J. Appl. Chem.* 1969, *32*, 211; *Chem. Abstr.* 1971, *75*, 1279 n); active principle - phorbol-12-tiglate-13-decanoate (I) - isolated from oil (*Science* 1976, *191*, 571).

NEW COMPOUNDS



I

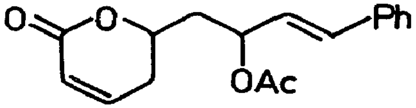
CRYPTOCARYA (Lauraceae)

C. bourdillonii Gamble

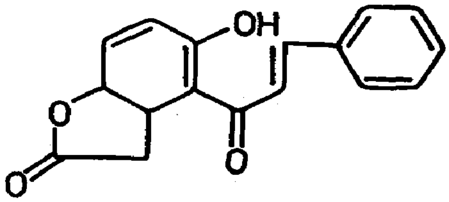
A new lactone - cryptocaryalactone - isolated from roots and characterised as 5,6-dihydro-2H-pyran-2-one (*Tetrahedron Lett.* 1971, 3401; *Indian J. Chem.* 1972, *10*, 149); 6-styryl-5,6-dihydro- 2H-pyran-2-one isolated from roots (*Indian J. Chem.* 1972, *10*, 149); cryptocaryone, mp. 153°, isolated and its structure elucidated as *5′,6′*-dihydrochalcone (*Tetrahedron Lett.* 1972, 3419).

Distribution : Reported to occur in Madras.

NEW COMPOUNDS



Cryptocaryalactone



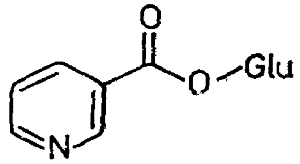
Cryptocaryone

CRYPTOLEPIS (Asclepiadaceae)

C. buchanani Roem. & Schult. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 82).

Isolation and structure of a pyridine alkaloid - buchananine (*Phytochemistry* 1978, *17*, 2047).

NEW COMPOUNDS



Buchananine

CUCUMIS (Cucurbitaceae)

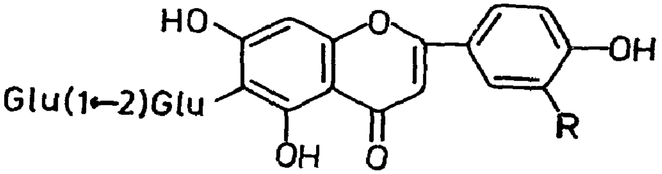
C. callosus (Rottl.) Cogn. syn. *C. trigonus* Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 83).

Stigmast-7-en-3β-ol, its β-D-glucoside, alnusenone and alnusenol isolated (*Planta Med.* 1976, *30*, 144).

C. melo L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 83).

Meloside A (6C-diglucosylapigenin), meloside L (6C-diglucosylluteolin) and their caffeoyl esters isolated from leaves (*Phytochemistry* 1976, *15*, 1053); six carotenes isolated, three of which identified as α-carotene (1.82), β-carotene (94.33) and ζ-carotene (2.30%) (*Agron. Trop.* 1977, *27*, 465; *Chem. Abstr.* 1978, *89*, 193854 a).

NEW COMPOUNDS



Meloside A
R = H
Meloside L
R = OH

C. prophetarum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 134).

Cucurbitacin Q1 obtained from fruits was shown to be trans form of cucurbitacin Q at 23-24 double bond (*Phytochemistry* 1973, *12*, 2741).

C. sativus L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 83).

Palmitic, stearic and oleic acids, their glycerides, sterols and squalene isolated from fruits (*Z. Naturforsch.* 1970, *25B*, 760; *Chem. Abstr.* 1970, *73*, 91192 k); sitosterol and stigmasta-7,22,25-trien-3β-ol isolated from seeds (*Tezisy Dokl. Soobshch.-Knof. Molodykh Uch. Mold.* 9th 1974, (pub 1975) 102; *Chem. Abstr.* 1976, *85*, 2513 y); cycloartenol acetate, 24-

methylenecycloartanol acetate and 24-ethylidenelophenol acetate, cycloeucalenol acetate, 24-methylenelophenol acetate and obtusifoliol acetate identified in plant seedlings (*Phytochemistry* 1975, *14*, 296); 24-ξ-ethyl-5-α-cholesta-7,22-dien-3β-ol, 24ε-methyl-5α-cholesta-7-ene, 24ξ-ethyl-5-a-cholesta-7-ene, 24-ethyl-5α-cholesta-7,24(28)Z-diene, 24 ξ-ethyl-5-α-cholesta-7,25-diene, 24 ξ-ethyl-5-α-cholesta-7,22,25-triene along with small amounts of cholesterol, 24 ξ-methylcholesterol and 24 ξ-ethylcholesterol, isolated from flowers (*Planta* 1977, *134*, 115; *Chem. Abstr.* 1977, *86*, 167879 f); cis-8-pentadecenal isolated (*Phytochemistry* 1977, *16*, 1831); α-spinasterol, stigmasta-7,22,25-trienol and stigmasta-7,25-dienol isolated from seed oil (*Taehan Hwahakhoe Chi* 1977, *21*, 193; *Chem. Abstr.* 1977, *87*, 130491 t).

C. trigonus Roxb.; see *C. callosus* (Rottl.) Cogn.

CUCURBITA (Cucurbitaceae)

C. maxima Duch. ex Lam. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 134).

Seed extract produced positive inotropic effect on frog heart; ECG in dog revealed elevation of QRS complex and decrease in heart rate (*Indian J. Pharmacol. 1978, 10, 315*).

Total organic acids in fruit, 6.7 mequiv./100 g of which nonvolatile acids were 91.2%; vitamin C content 17.7 mg/100 g (*Miyazaki Daigaku Nogakubu Kenkyu Hokobu* 1976, *23*, 411; *Chem. Abstr.* 1977, *87*, 114608 f); α-spinasterol, stigmasta-7,22,25-trienol and stigmasta-7,25-dienol isolated from seed oil (*Taehan Hwahakhoe Chi* 1977, *21*, 193; *Chem. Abstr.* 1977, *87*, 130491 t); linoleic (52.0), oleic (29.0%) and linolenic (tr) acids and β- and γ-tocopherols (33.8 mg/100 g) in seed oil; total carotenoid content was 15 ppm, of which luteolin constituted (71.0) and β-carotene (12.0%); α-carotene, cryptoxanthin and flavoxanthin present in smaller amounts (*Fette, Seifen, Anstrichm.* 1978, *80*, 315; *Chem. Abstr.* 1978, *89*, 211944 m); isorhamnetin-3-O-rutinoside, kaempferol-3-O-rutinoside and kaempferol-3-O-robinobioside as well as two minor flavonol glycosides from pollen whereas stigma contained former three compounds (*Bull. Liaison, Groupe Polyphenols* 1978, *8*, 444; *Chem. Abstr.* 1979, *91*, 16683 q).

C. moschata (Duch. ex Lam.) Duch. ex Poir.

H. - Kaddu, Sitaphal; B. - Kumra; Assam - Lal-kumra, Mitha-lau; Mar. - Kali-dudhi; Eng. - Crooknecked squash.

An antigibberellin - cucurbitacin B - isolated (*Nature New Biol.* 1973, *244*, 223); detection of fumaric, succinic, malic, citric, ascorbic and galacturonic acids by TLC; malic acid was predominant acid (362 mg/100 g fresh fruit) (*Miyazaki Daigaku Nogakubu Kenkyu Hokoku* 1976, *23*, 417; *Chem. Abstr.* 1977, *87*, 114609 g); total organic acids 9.47%, nonvolatile acids in total organic acids 98.6% and vitamin C content 13.8% (*Miyazaki Daigaku Nogakubu Kenkyu Hokoku 1976, 23, 411; Chem. Abstr. 1977, 87, 114608 f*); isorhamnetin-3-O-rutinoside, kaempferol-3-O-rutinoside and kaempferol-3-O-robinobioside isolated from pollen; stigma contained only kaempferol-3-O-rutinoside (*Bull. Liaison, Groupe Polyphenols* 1978, *8*, 444; *Chem. Abstr.* 1979, *91*, 16683 q).

Distribution : Cultivated throughout India in tropical and subtropical regions.

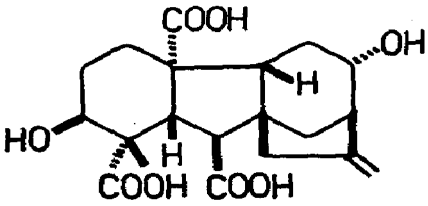
BIOLOGICAL ACTIVITY

Cucurbitacin B (9 μg/plant) reduced growth effect of gibberellin GA3 (5 μg/plant) by 50.0%. Cucurbitacins E, I, J and K also studied in doses of 1,5 and 10 μg/plant with equal amount of GA3 and pronounced inhibitory effect was found in all cases when 5 μg/plant was used (*Nature New Biol.* 1973, *244*, 223).

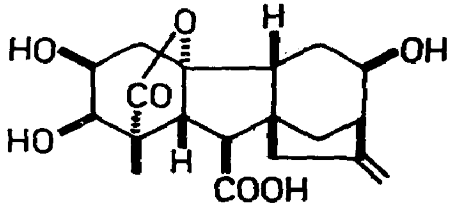
C. pepo L. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 83).

Structure elucidation of gibberellins A39, A48 and A49 (C12-epimer of A48) and a new kaurenolide (I) isolated from seeds (*Agric. Biol. Chem.* 1977, *41*, 181; *Chem. Abstr.* 1977, *86*, 190255 h); isorhamnetin-3-O-rutinoside isolated from pollen whereas stigma contained kaempferol-3-O-rutinoside and rutin (*Bull. Liaison, Groupe Polyphenols* 1978, *8*, 444; *Chem. Abstr.* 1979, *91*, 16683 q).

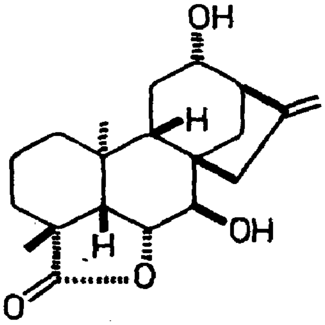
NEW COMPOUNDS



Gibberellin A39



Gibberellin A48



I

CUDRANIA (Moraceae)

C. cochinchinensis (Lour.) Kudo & Masam.; see *Maclura cochinchinensis* (Lour.) Corner

C. javanensis Hook.f.; see *Maclura cochinchinensis* (Lour.) Corner

CUMINUM (Apiaceae)

C. cyminum L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 84).

Alcoholic extract of seeds at 150 mg/kg showed 100% antifertility effect in early pregnancy in female rats (*Indian J. Med. Res.* 1976, *64*, 1133).

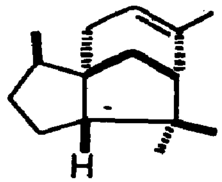
Apigenin-7-O-glucoside and luteolin-7-O-glucoside isolated from fruits (*Pharmazie* 1978, *33*, 296; *Chem. Abstr.* 1978, *89*, 103738 p).

CUPRESSUS (Cupressaceae)

C. corneyana Hort. ex Carriere syn. *C. funebris* auct. (non Endl). (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 135).

Isolation and structure of a tricyclic sesquiterpene - α-funebrene (*Indian J. Chem.* 1973, *11*, 508).

NEW COMPOUNDS



α-Funebrene

C. funebris Endl.; see *C. corneyana* Hort. ex Carriere

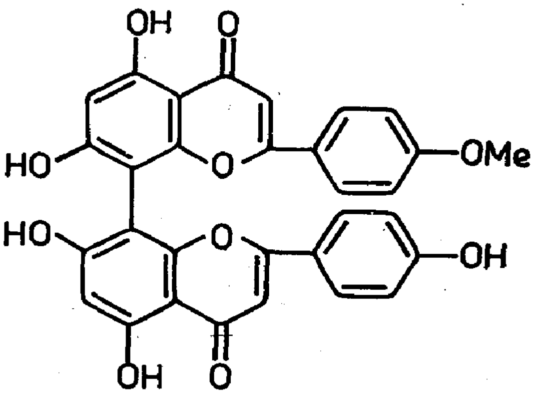
C. lusitanica Mill. var. *benthami* Carr.

Eng. - Goa cypress, Mexican cypress.

A new biflavone - 4′-O-methylcupressuflavone - along with amentoflavone, cupressuflavone, podocarpusflavone A and mono-O-methylhinokiflavone - isolated from leaves (*Indian J. Chem.* 1978, *16*B, 655).

Distribution : Western Ghats and Goa, cultivated.

NEW COMPOUNDS

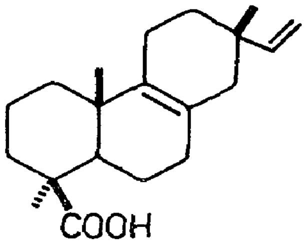


4′-O-Methylcuppressuflavone

C. sempervirens L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 135).

Cupressic acid isolated from cones (*Trav. Soc. Pharm. Montpellier* 1973, *33*, 367; *Chem. Abstr.* 1974, *80*, 143047 h); neocupressic acid and isocupressic acid isolated from green cones (*Trav. Soc. Pharm. Montpellier* 1976, *36*, 219; *Chem. Abstr.* 1977, *80*, 27662 e); α-pinene and car-3-ene as major components of essential oil (*Parfums, Cosmet. Aromes* 1978, *20*, 33, 39; *Chem. Abstr.* 1978, *89*, 203992 k).

NEW COMPOUNDS



Neocupressic acid

C. torulosa D. Don (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 136).

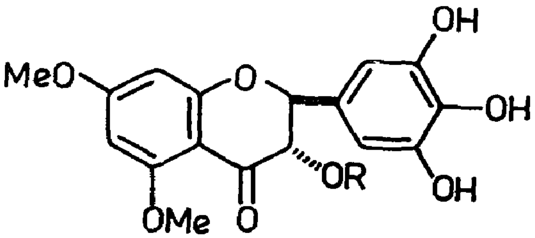
Cysteine, ornithine, asparagine, glycine, glutamic acid, threonine, α-alanine, β-alanine and norvaline isolated from fruits (*J. Sci. Res.* 1971, *3*, 1; *Chem. Abstr.* 1974, *80*, 45669 t); identification of fifteen terpenoids in fruit oil by GC (*Indian Perfum.* 1976, *20*, 137; *Chem. Abstr.* 1978, *88*, 110371 w); (+)totarol, (+)ferruginol, (+)sempervirol, (+)communic acid, (-)sandaracopimaric and (+)imbricatolic acids from leaves; methyl (+)communate, (+)totarol and (+)ferruginol from stem bark (*Indian J. Chem.* 1977, *15*B, 397).

CURCULIGO (Amaryllidaceae)

C. orchioides Gaertn. syn. *Hypoxis orchioides* Kurz (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 84).

A new glycoside - 5,7-dimethoxy-dihydromyricetin-3-O-α-L-xylopyranosyl(4→1)-β-D-glucopyranoside (I) - isolated from rhizomes and characterised (*Planta Med.* 1976, *29*, 291); yuccagenin and lycorine isolated (*Indian J. Pharm. Sci.* 1978, *40*, 104).

NEW COMPOUNDS



I

R = Xyl(4→1)Glu

BIOLOGICAL ACTIVITY

Flavanone glycoside (I) showed powerful uterine stimulant activity in guinea pigs, rats and rabbits (*J. Res. Indian Med.* 1975, *10*, 104).

CURCUMA (Zingiberaceae)

C. amada Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 136).

Pharmacognostic studies on rhizome and roots (*J. Res. Indian Med.* 1973, *8*, 25).

C. longa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 136).

Aqueous extract (80 mg/kg) completely suppressed carrageenin- induced oedema; at 40 mg/kg activity was comparable to that of indomethacin (5 mg/kg). It also showed very potent activity in granuloma pouch test (*Indian J. Med. Res.* 1976, *64*, 601). Campesterol, stigmasterol, β-sitosterol, cholesterol and fatty acids isolated from rhizomes; fatty acids comprised of saturated straight chain, saturated iso, monoenoic and dienoic acids (*Soul Taehakkyo Yakhak Nonmunjip* 1976, *1*, 105; *Chem. Abstr.* 1977, *87*, 114582 t).

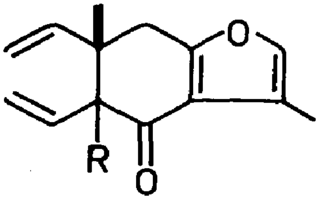
BIOLOGICAL ACTIVITY

Essential oil (0.1 mg/kg) in rats showed significantly more marked anti-inflammatory effect than cortisone acetate (10 mg/kg); it inhibited development of arthritic lesions but not late secondary lesions in adrenalectomised animals (*Indian J. Med. Res.* 1972, *60*, 138); curcumin possessed considerable anti-5-HT-activity which appeared to play an important role in preventing phenylbutazone or 5-HT-induced gastric damage including ulcers (*Indian J. Pharmacol.* 1974, *6*, 87); uptake, distribution and excretion of curcumin studied; when administered orally at 1 g/kg in rats excretion in faeces was 75.0% and negligible in urine; it was poorly absorbed from gut. No toxic effects observed upto 5 g/kg dose. When injected i.v. it was actively transported into bile against concentration gradients of several hundred times. Major part of drug was however metabolised (*Acta Pharmacol. Toxicol.* 1978, *43*, 86; *Chem. Abstr.* 1979, *90*, 33721 x); clinical trials showed that plant definitely reduced cough and dyspnoea; more than 65% cases showed good response; amount of sputum was also significantly reduced (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 110).

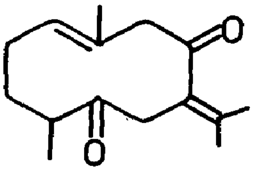
C. zedoaria (Berg.) Rosc. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 136).

Isolation of main component of essential oil - curzerenone - and its structure elucidation (*Yakugaku Zasshi* 1970, *90*, 863; *Chem. Abstr.* 1970, *73*, 131148 j); absolute structure of zederone established (*J. Chem. Soc.* C 1971, 688); another sesquiterpene - dehydrocurdione - isolated and characterised (*Chem. Pharm. Bull.* 1972, *20*, 987); synthesis of pyrocurzerenone (*J. Chem. Soc.* Perkin 1 1974, 540); curzerenone, pyrocurzerenone and new furanosesquiterpenoids - furanodienone (I), isofuranodienone (II) and epicurzerenone - isolated and their absolute configurations established (*J. Chem. Soc.* Perkin 1 1975, 478).

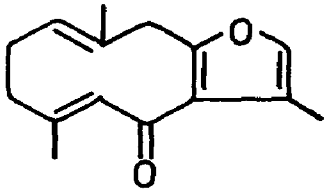
NEW COMPOUNDS



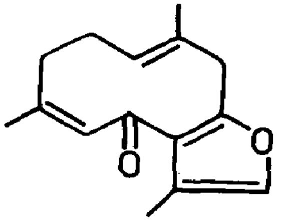
Curzerenone
R = α-H
Epicurzerenone
R = β-H



Dehydrocurdione



I



II

CUSCUTA (Cuscutaceae)

C. reflexa Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 137).

Alcoholic extract (0.5 mg) caused rise in tone and amplitude of perfused frog heart but 2 mg caused immediate systolic arrest. Extract (1 mg/kg) administered i.v. in dog caused fall in blood pressure (60 mm) leading to tachyphylaxis on repeating administration 3-4 times. Studies on smooth muscles suggested that extract had direct depressant action on rabbit duodenum (*Indian J. Pharmacol.* 1973, *5*, 344).

CYAMOPSIS (Papilionaceae)

C. tetragonoloba (L.) Taub. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 85).

Seeds depress growth in poultry and rat (*Indian J. Appl. Chem.* 1971, *34*, 231; *Chem. Abstr.* 1972, *77*, 85530 k).

Detection of gallic acid, galactose and several flavonoids in hydrolysed extract of seeds by PC (*Indian J. Appl. Chem.* 1971, *34*, 231; *Chem. Abstr.* 1972, *77*, 85530 k); pigment of seed coat found to be a complex of Fe(ic), galactose, gallic acid and 2,3,4-trihydroxybenzoic acid (*J. Agric. Food Chem.* 1979, *27*, 1274; *Chem. Abstr.* 1979, *91*, 189759 x).

CYANOTIS (Commelinaceae)

C. arachnoidea Clarke

Two insect moulting hormones - β-ecdysone and its acetate - (1.2% of whole plant, 2.9% of dry roots) isolated (*Hua Hsueh Hsueh Pao* 1978, *36*, 137; *Chem. Abstr.* 1978, *89*, 176352 t).

Distribution : Nilgiri Hills.

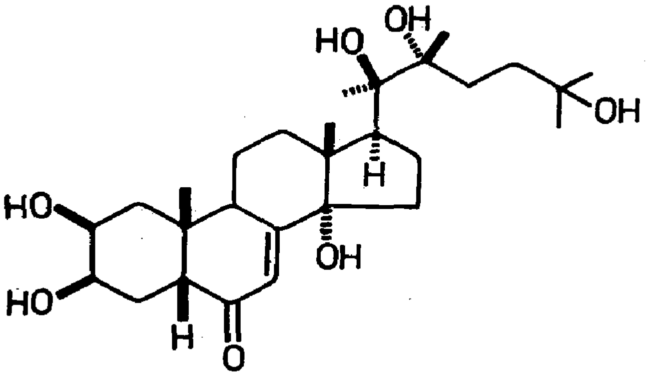
C. barbata D. Don; see *C. vaga* (Lour.) J. A. & J. H. Schultes

C. vaga (Lour.) J. A. & J. H. Schultes syn. *C. barbata* D. Don

A new phytoecdysone - commisterone, mp. 146° - isolated from leaves and shown to be stereoisomer of crustecdysone (*Experientia* 1970, *26*, 1053).

Distribution : Himalayas from Kashmir eastwards, ascending to 2400 m, Khasi Hills, alt. 1400 m.

NEW COMPOUNDS



Commisterone

CYATHEA (Cyatheaceae)

C. spinulosa Wall. ex Hook.

Lupeol and sitosterol isolated (*Phytochemistry* 1978, *12*, 1819).

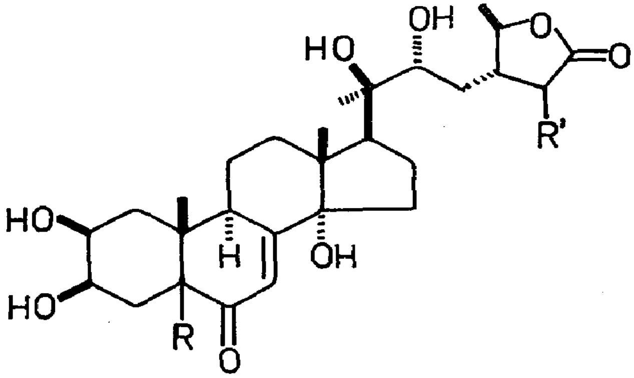
Distribution : Throughout India in hilly regions, Bhutan and Nepal.

CYATHULA (Amaranthaceae)

C. capitata Moq. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 138).

Isolation of a new insect metamorphosing compound-sengosterone - and its structure elucidation (*Tetrahedron* 1970, *26*, 887); isolation and structure determination of ecdysterols - isocyasterone and epicyasterone (*Phytochemistry* 1971, *10*, 3137; *Chem. Pharm. Bull.* 1971, *19*, 433).

NEW COMPOUNDS



Sengosterone
R = β-OH, R′ = β-Me
Isocyasterone
R = β-H, R′ = α-Me
Epicyasterone
R = α-H, R′ = β-Me

CYCAS (Cycadaceae)

C. circinalis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 139).

Amentoflavone, podocarpusflavone A, 2,3-dihydroamentoflavone, 2,3-dihydrohinokiflavone, isoginkgetin and bilobetin isolated from leaves (*Indian J. Chem.* 1973, *11*, 1209).

C. revoluta Thunb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 139).

Amentoflavone, 2,3-dihydroamentoflavone, hinokiflavone, 2,3-dihydrohinokiflavone, podocarpusflavone A and sotetsuflavone isolated from leaves (*Phytochemistry* 1971, *10*, 1936; *Indian J. Chem.* 1973, *11*, 1209).

C. rumphii Miq. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 86).

Amentoflavone, podocarpusflavone A, 2,3-dihydromentoflavone, 2,3-dihydrohinokiflavone, isoginkgetin and bilobetin isolated from leaves (*Indian J. Chem.* 1973, *11*, 1209).

CYCLAMEN (Primulaceae)

C. neapolitanum Tenore

Three triterpene saponins isolated from bulbs found identical with cyclamin, deglucocyclamin I and deglucocyclamin II (*Doga* 1977, *1*, 148; *Chem. Abstr.* 1979, *90*, 104288 z).

Distribution : Introduced into India, grown in gardens.

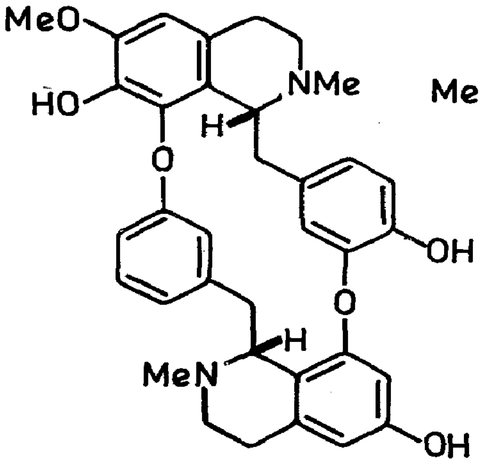
CYCLEA (Menispermaceae)

C. barbata Miers; see *C. peltata* (Lam.) Hook.f. & Thoms.

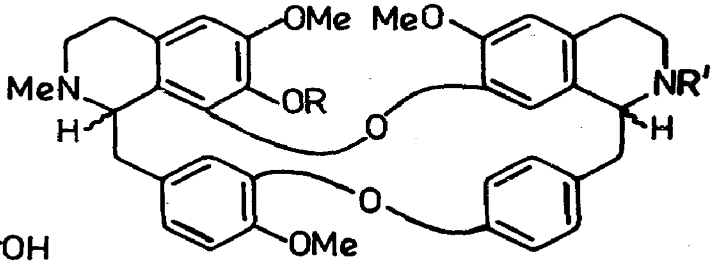
C. peltata (Lam.) Hook.f. & Thoms. syn. *C. barbata* Miers (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 141).

Five new bisbenzylisoquinoline alkaloids - cycleapeltine, cycleadrine, cycleacurine, cycleanorine and cycleahomine chloride - isolated (*J. Org. Chem.* 1973, *38*, 1846); tetrandrine mono-N2'-oxide isolated and characterised; isochondodendrine and chondocurine also obtained (*Arch. Pharm.* 1977, *310*, 95; *Chem. Abstr.* 1977, *87*, 18964 y).

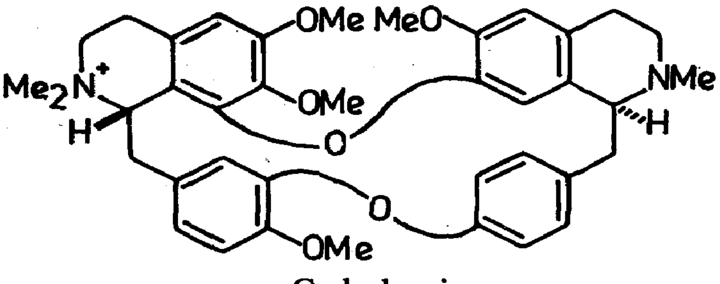
NEW COMPOUNDS



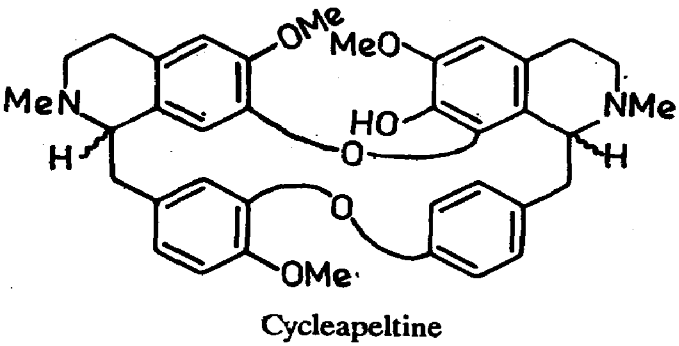
Cycleacurine



Cycleadrine
R = H, R' = Me
Cycleanorine
R = Me, R' = H



Cycleahomine



Cycleapeltine

BIOLOGICAL ACTIVITY

Tetrandrine decreased aseptic inflammation in rats, decreased vascular permeability and serum hyaluronidase activity, when given i.p. to rats at 50 mg/kg. However, tetrandrine had no anti- inflammatory activity when given to adrenalectomised rats (*Tr. Vses. Nauch. Issled. Inst. Lek. Rast.* 1971, *14*, 43; *Chem. Abstr.* 1973, *79*, 27308 z).

CYDONIA (Rosaceae)

C. oblonga Mill. syn. *C. vulgaris* Pers. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 86).

Ursolic acid isolated from fruit and leaves (*Khim. Prir. Soedin.* 1976, *12*, 399; *Chem. Abstr.* 1976, *85*, 139719 q); roseoside isolated from fruits (*Phytochemistry* 1976, *15*, 1990); mixture of n-paraffins (C_{23}, C_{25}, C_{27} and C_{29}), alcohols (C_{22}, C_{24}, C_{26} and C_{28}), β-sitosterol, saringosterol, uvaol, palmitic, oleic, linoleic and ursolic acids from fruits (*Agric. Biol. Chem.* 1978, *42*, 1589; *Chem. Abstr.* 1978, *89*, 160177 d).

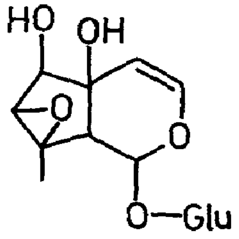
C. vulgaris Pers.; see *C. oblonga* Mill.

CYMBALARIA (Scrophulariaceae)

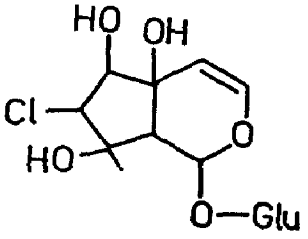
C. muralis G.M. Schreb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 87).

Antirrhinoside and linarioside isolated (*Phytochemistry* 1974, *13*, 1018).

NEW COMPOUNDS



Antirrhinoside



Linarioside

CYMBIDIUM (Orchidaceae)

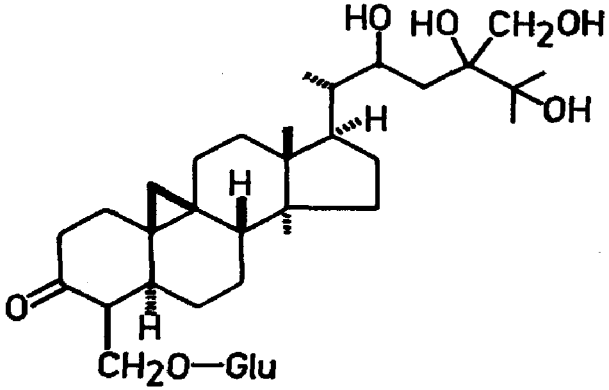
C. giganteum Wall. ex Lindl; see *C. iridioides* D. Don

C. iridioides D. Don syn. *D. giganteum* Wall. ex Lindl.

Isolation and structure of a new triterpene glucoside - cymbidoside (*Phytochemistry* 1978, *17*, 1975).

Distribution : Himalayas from Kumaon to Bhutan ascending to 1200 m and Meghalaya, alt. 1200-1600 m.

NEW COMPOUNDS



Cymbidoside

CYMBOPOGON (Poaceae)

C. caesius (Nees) Stapf syn. *Andropogon schoenanthus* L. var. *gracillimus* Hook.f.

Tam. - Kamati, Kamakshi-pillu; Tel. - Kamanchi-gaddi; Kan. - Kamancha-hullu; Mal. - Inchipul.

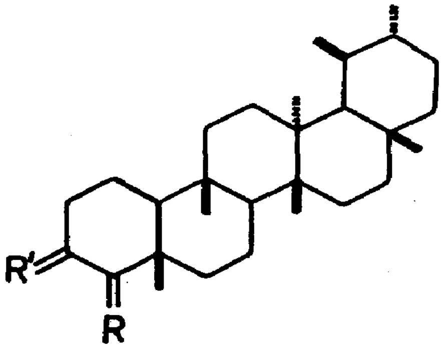
Perillaldehyde, carvacrol and d-nerolidol identified in essential oil which was found active against *Escherichia coli* (*Indian Perfum*. 1977, *22*, 129; *Chem. Abstr.* 1978, *89*, 152564 n).

Distribution : Peninsular India and Gujarat.

C. citratus (DC.) Stapf syn. *Andropogon citratus* DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 87).

Structure of cymbopogone isolated from leaf wax (*Tetrahedron Lett.* 1975, 3099); a new triterpenoid - cymbopogonol - isolated (*Phytochemistry* 1976, *15*, 1074).

NEW COMPOUNDS



Cymbopogone

R = β-Me,H, R′ = O

Cymbopogonol

R = CH_2, R′ = β-OH,H

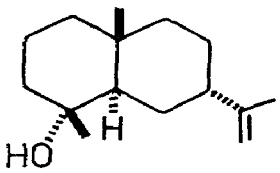
C. distans (Nees ex Steud.) Wats. syn. *Andropogon distans* Nees ex Steud.

l-α-phellandrene, d-limonene, d-citronellal, d-menthone, l-carbomenthone, d-citronellol, geraniol, methyl eugenol, caproic acid and citronellic acid identified in essential oil by GLC and TLC (*Indian Perfum.* 1976, *20*, 67; *Chem. Abstr.* 1978, *88*, 141486 s).
Distribution : North-west India.

C. flexuosus (Nees ex Steud.) Wats. syn. *Andropogon nardus* L. var. *flexuosus* (Nees ex Steud.) Hack.

Eng. - East Indian lemon grass, Cochin or Malabar lemongrass; Mal. - Kodi-pullu.

Citral (71.0%) isolated from oil (*Indian Perfum.* 1975, *18*, 56; *Chem. Abstr.* 1977, *87*, 90576 r); triacontane, triacontanol, β-sitosterol and arundoin isolated from leaves (*Indian J. Chem.* 1975, *13*, 1108); structure elucidation of a new sesquiterpene alcohol - isointermedeol - isolated from essential oil; α-pinene (0.10), β-pinene (1.01), car-3-ene (0.10), myrcene (0.66), limonene (0.84), ocimene (0.09), β-phellandrene (5.78), α-terpinene (0.18), p-cymene (0.18), terpinolene (0.07), methylheptenone (0.41), citronellal (1.2), δ-elemene (0.66), geranyl acetate (0.20), β-elemene (2.36), β-caryophyllene (3.72), β-selinene (3.84), γ-elemene (0.05), geraniol (0.46), α-bisabolene (0.08), β-bisabolene (0.13), α-curcumene (0.11), δ-cadinene (0.05), γ-cadinene (1.18), methyleugenol (0.92), elemol (0.49), β-caryophyllene oxide (0.48), eugenol (0.12), β-eudesmol (4.0), elemicin (7.22), farnesol (0.97) and juniper camphor(9.23%) also isolated (*Phytochemistry* 1976, *18*, 671).
Distribution : Peninsular India, in plains.
NEW COMPOUNDS



Isointermedeol

C. flexuosus (Nees ex Steud.) Wats. var. *sikkimensis* Bor

Methyleugenol estimated in whole plant (81.8), leaves (82.4), stems (tr) and flowering tops (77.6%) (*Indian Drugs* 1977, *14*, 195).
Distribution : Sikkim.

C. jwarancusa (Jones) Schult. syn. *Andropogon jwarancusa* Jones (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 87).

Detection of car-4-ene (20.0), piperitone (44.0), car-3-ene (2.0), β-caryophyllene (1.5), p-cymene (1.0), piperitol (18.0), perillyl alcohol (10.0), farnesol (1.0) and palmitic acid (2.0%) in essential oil by GLC (*Riechst. Aromen Koerperpflegem.* 1973, *23*, 353, 358; *Chem. Abstr.* 1974, *80*, 87401 e); sixty four compounds identified in essential oil by GLC; oil contained piperitone (60-70%) (*Phytochemistry* 1978, *17*, 1433).

C. nardus (L.) Rendle syn. *Andropogon nardus* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 141).

Detection of isocaproic, isovaleric, butyric and propionic acids, d-citronellal, citral, isovaleraldehyde, pelargonaldehyde, geraniol and citronellol in essential oil by GLC (*Indian Oil Soap J.* 1972, *37*, 305; *Chem. Abstr.* 1974, *80*, 40923 m).

C. nardus L. var. *stracheyi* Hook.f.; see *C. pospischilii* (K. Schum.) Hubbard

C. pendulus (Nees ex Steud.) Wats. syn. *Andropogon pendulus* Nees ex Steud.

Citral (75.0%) isolated from oil (*Indian Perfum.* 1975, *18*, 56; *Chem. Abstr.* 1977, *87*, 90576 r; *Indian Perfum.* 1976, *20*, 29; *Chem. Abstr.* 1977, *86*, 185955 g).

Distribution : North-eastern India.

C. pospischilii (K. Schum.) Hubbard syn. *Andropogon nardus* L. var. *stracheyi* Hook.f., *C. nardus* L. var. *stracheyi* Hook.f.

Major components of essential oil (0.25%) from plant identified as β-pinene (15.0), limonene (28.0) and α-phellandrene (25.0%) (*J. Indian Chem. Soc.* 1978, *55*, 621).

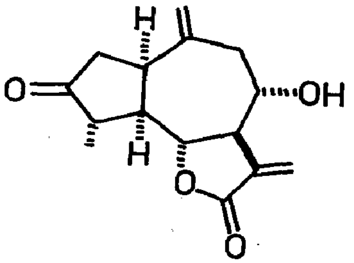
Distribution : North-west Himalayas, alt. 1800 m.

CYNARA (Asteraceae)

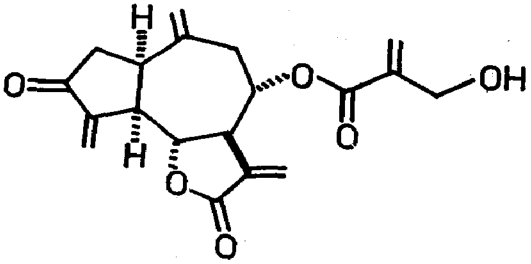
C. scolymus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 141).

Cynaropicrin and grosheimin isolated from Italian plant (*Tetrahedron Lett.* 1971, 4775; *Planta Med.* 1974, 25, 149); cynaropicrin and dehydrocynaropicrin isolated from Polish plant (*Tetrahedron* 1971, 4775); absolute stereochemistry of cynaropicrin, dehydrocynaropicrin and grosheimin (*Chem. Commun.* 1972, 386); hydroxymethylacrylic acid isolated from leaves (*Plant Med. Phytother.* 1974, *8*, 199; *Chem. Abstr.* 1975, *82*, 40681 y).

NEW COMPOUNDS



Grosheimin



Dehydrocynaropicrin

CYNOCTONUM (Spigeliaceae)

C. mitreola (L.) Britton; see *Mitreola petiolata* (Gmel.) Torr. & Gray

CYPERUS (Cyperaceae)

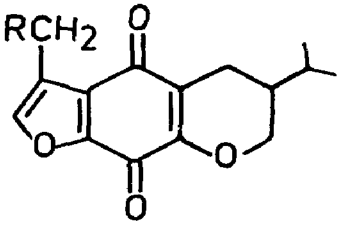
C. distans L.f.

Scabequinone, dihydroscabequinone, hydroxyscabequinone and scabequinonol isolated

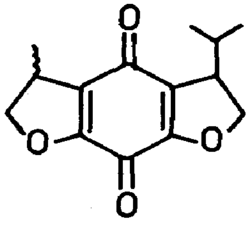
from rhizomes (*Tetrahedron Lett*. 1973, 3)

Distribution : Throughout plains of India ascending to 900 m in hills.

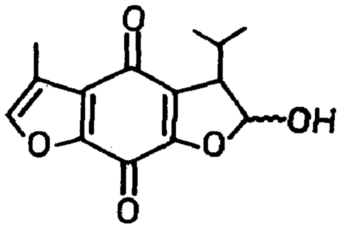
NEW COMPOUNDS



Scabequinone
R = H
Hydroxyscabequinone
R = OH



Dihydroscabequinone



Scabequinol

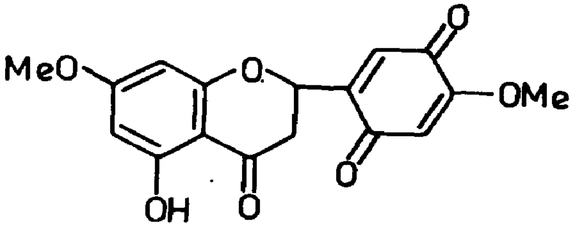
C. iria L. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 88).

Detection of cyperene, caryophyllene, γ-cadinene, karacolene, α-cadinol, methyl 3,7,11-trimethyl-trans-2, trans-6,cis-9, 11-dodecatetraenoate, methyl 3,7,11-trimethyl-trans-2,trans-6,trans-9,11-dodecatetraenoate, methyl 3,7,11-trimethyl-11-hydroxy-trans-2,trans-6,trans-9-dodecatrienoate and minor components - α-pinene, β-pinene, limonene, p-cymene, linalool, α-copaene, β-elemene, humulene, α-elemene, β-selinene, germacrene, calamene, δ-cadinene, methyl 3,7,11-trimethyl-trans-2-trans-6,10-dodecatrienoate besides new compounds - cis-3,cis-5-dodecadien-1-ol and its acetate in root oil by GLC (*Nippon Nogei Kagaku Kaishi* 1978, *52*, 379; *Chem. Abstr.* 1979, *90*, 192372 a).

C. pedunculatus (R. Br.) Kern syn. *Remirea maritima* Aubl. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 211).

Flavanone quinone - remerin - isolated (*Tetrahedron Lett.* 1973, 7).

NEW COMPOUNDS



Remerin

C. pilosus Vahl syn. *C. pilosus* Vahl var. *obliqua* (Nees) Clarke, *C. pilosula* Vahl var. *polyantha* Clarke.

A new compound - dimethyl 3,7,11-trimethyl-2E,6E,10E-dodecatrienedioate (I) - isolated along with caryophyllene, juniper camphor, 2E,6E-farnesyl acetate and methyl palmitate from essential oil (*Nippon Kagaku Kaishi* 1979, 255; *Chem. Abstr.* 1979, *90*, 164723 x).

Distribution : Throughout India, ascending to 1500 m in the hills.

NEW COMPOUNDS

$$MeOOC\text{-}C\text{-}C(Me) = CH\text{-}CH_2\text{-}CH_2\text{-}C(Me) = CH\text{-}CH_2\text{-}CH_2\text{-}C(Me) = CH\text{-}COOMe$$

I

C. pilosula Vahl var. *polyantha* Clarke; see *C. pilosus* Vahl

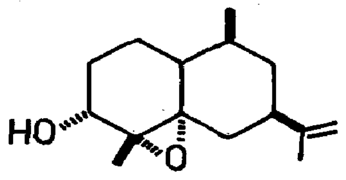
C. pilosus Vahl var. *obliqua* (Nees) Clarke; see *C. pilosus* Vahl

C. rotundus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 142).

Root extract possessed tranquillising activity. It had smooth muscle relaxant activity on rabbit ileum. Extract also showed significant antipyretic and antiinflammatory activities (*Indian J. Med. Res.* 1970, *58*, 103).

Isolation of 4α,5α-oxidoeudesm-11-en-3α-ol (I) from rhizomes and determination of its structure (*Phytochemistry* 1976, *15*, 1265); cyperene, β-selinene, cyperenone and α-cyperone isolated from rhizomes (*Zasso Kenkyu* 1977, *22*, 14; *Chem. Abstr.* 1978, *88*, 86013 h).

NEW COMPOUNDS

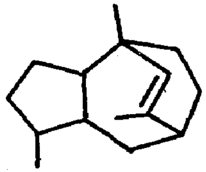


I

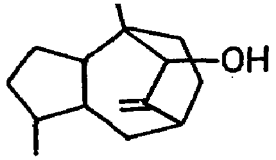
C. scariosus R. Br. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 144).

Rotundene and rotundenol isolated from oil and their structures elucidated (*Indian J. Chem.* 1970, *8*, 854; *Tetrahedron Lett.* 1977, 2121); in addition to (-)β-selinene, a new tricyclic hydrocarbon - isopatchoula-3,5-diene - isolated from oil and characterised (*Indian J. Chem.* 1978, *16*B, 148).

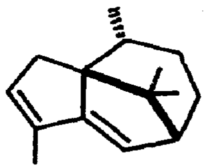
NEW COMPOUNDS



Rotundene



Rotundenol



Isopatchoula-3,5-diene

C. serotinus Rottb. syn. *Juncellus serotinus* Clarke

Detection of β-elemene, caryophyllene, α-humulene, β-selinene, methyl trans,trans-farnesate, trans,trans-farnesyl acetate, α-cyperone, β-guaiene, δ-cadinene, calamene and

cyperotundone in essential oil (0.02%) by GLC (*Nippon Kagaku Kaishi* 1977, 1018; *Chem. Abstr.* 1977, *87*, 172695 t).

Distribution : Kashmir, alt. 1700-1900 m.

CYPHOMANDRA (Solanaceae)

C. betacea (Cav.) Sendtn.

Eng. - Tree tomato.

Solacaproine isolated from roots and characterised as N,N-bis(4-dimethylamino-butyl) hexanamide, solamine, tropinone, cuscohygrine, hyoscyamine (atropine), tropine and tigloidine also isolated (*J. Chem. Soc.* C 1972, 2017).

Distribution : Native of Peru, cultivated in hilly regions of Assam, Bengal, Maharashtra, Tamil Nadu, Karnataka and Travancore, alt. 300-2300 m.

NEW COMPOUNDS

$$Me(CH_2)_4CON(CH_2CH_2CH_2CH_2NMe_2)_2$$

Solacaproine

CYRTOPHYLLUM (Loganiaceae)

C. peregrinum Blume; see *Fagraea fragrans* Roxb.

CYTISUS (Papilionaceae)

C. scoparius (L.) Link; see *Sarothamnus scoparius* (L.) Wimm. ex W.D.J. Koch

DACTYLIS (Poaceae)

D. glomerata L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 145).

γ-L-Glutamyl-L-glutamine isolated from tillering nodes with roots (*Bull. Acad. Pol. Sci. Ser. Sci. Biol.* 1971, *19*, 95; *Chem. Abstr.* 1971, *75*, 16075 n).

DAEMIA (Asclepiadaceae)

D. extensa R. Br.; see *Pergularia daemia* (Forsk.) Choiv.

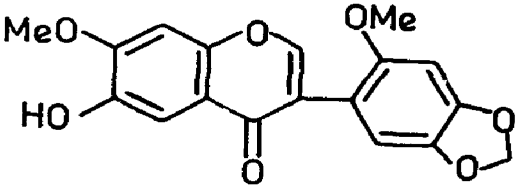
DALBERGIA (Papilionaceae)

D. assamica Benth.

6-Hydroxy-2',7-dimethoxy-4',5'-methylenedioxyisoflavone (I) along with β-sitosterol, ψ-baptigenin and β-sitosterol-β-D-glucoside isolated from seeds and pods; dalbinol and dalbin from seeds (*Curr. Sci.* 1978, *47*, 856; *Nat. Acad. Sci. Lett.* India 1978, 253; *Chem. Abstr.* 1979, *90*, 3117 n).

Distribution : Tropical Himalayas from Kumaon eastward to Assam.

NEW COMPOUNDS



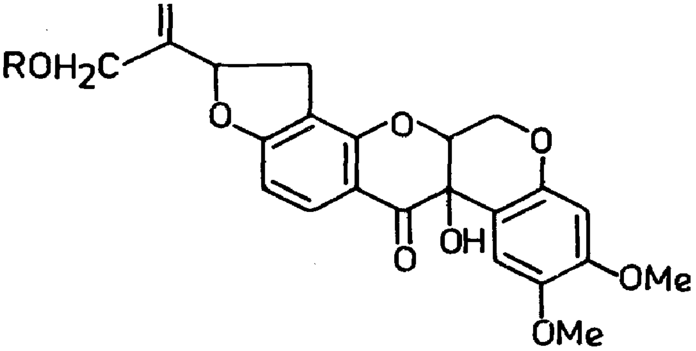
I

D. hireina Wall. ex Benth.; see *D. sericea* G. Don

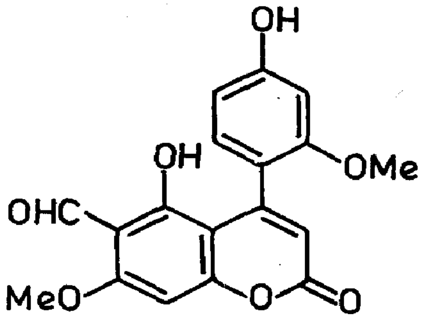
D. latifolia Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 146).

A new coumarin - sisafolin - from seeds characterised as 2′,7-dimethoxy-4′,5-dihydroxy-6-formyl-4-phenylcoumarin (*Proc. Nat. Acad. Sci.*, India 1970, *40*A 165; *Chem. Abstr.* 1972, *76*, 56570x); triacontane, β-sitosterol, dalbergichromene, lupeol, acetyloleanolic acid, γ-sitosterol (mixture of β-sitosterol and campesterol), (R)latifolin, (R)4-methoxydalberginone, methyl-dalbergin and dalbergin from bark (*Phytochemistry* 1971, *10*, 2551); a new 12α-hydroxyrotenoid - dalbinol - isolated from seeds and its structure determined (*Phytochemistry* 1978, *17*, 1442); isolation and structure of dalbin (*Phytochemistry* 1979, *18*, 188).

NEW COMPOUNDS



Dalbinol
R = H
Dalbin
R = Glu



Sisafolin

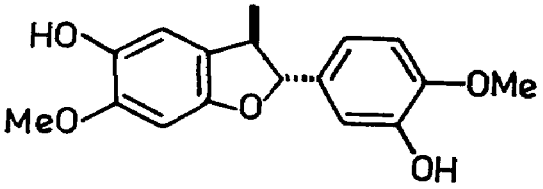
D. melanoxylon Guill. & Perr.

Eng. - African blackwood, Senegal or Sudan ebony, Chinese blackwood.

Structure of melanoxin confirmed by biogenetic type synthesis (*Indian J. Chem.* 1974, *12*, 20).

Distribution : Native of tropical Africa, introduced into India. Found in Kanara, Konkan and planted in Bombay, Madras and Calcutta.

NEW COMPOUNDS



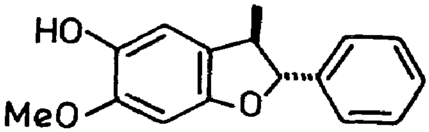
Melanoxin

D. obtusa Lecomte

Structure of obtusafuran confirmed by biogenetic type synthesis (*Indian J. Chem.* 1974, *12*, 20).

Distribution : Native of Panama, introduced into India.

NEW COMPOUNDS



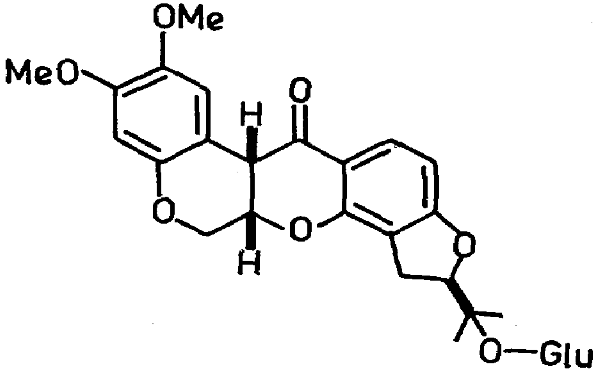
Obtusafuran

D. paniculata Roxb.

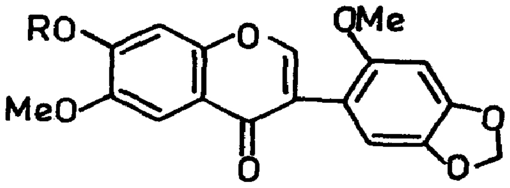
New isoflavonoid glycosides - dalpanitin, dalpatin and dalpanin, mp. 267° - isolated from seeds and structures of dalpanitin and dalpatin determined; dalpanin also isolated from flowers and characterised as a C-glucosylisoflavonone (*Tetrahedron* 1972, *28*, 5377; *Phytochemistry* 1973, *12*, 2543; *Proc. Indian Acad. Sci.* 1975, *81*A, 23; *Chem. Abstr.* 1975, *82*, 108844 k); apigenin and luteolin from flowers (*Indian J. Chem.* 1973, *11*, 969; *Phytochemistry* 1973, *12*, 2543); caviunin and (+)pinitol from flowers and roots; former compound also isolated from seeds (*Phytochemistry* 1973, *12*, 2543, 3003; *J. Indian Chem. Soc.* 1979, *56*, 81); dalpatien and dalpanol-O-glucoside from seeds;former compound characterised as 2',6-dimethoxy-7-hydroxy-4',5'-methylenedioxyisoflavone (*J. Chem. Soc.* 1971, *29*; *Phytochemistry* 1973, *12*, 3003; *Indian J. Chem.* 1975, *13*, 425); heartwood yielded biochanin A-7-O-glucoside and paniculatin (*Indian J. Chem.* 1973, *11*, 89); 8C-glucosylprunetin along with sissotrin (biochanin A-7-O-glucoside) and formononetin isolated from stem bark (*Curr. Sci.* 1974, *43*, 74); two new rhamnoglucosides - biochanin A-7-O-rutinoside (I) and 4'-methoxy-7-O-rutinoside isoflavone (II) - along with formononetin from bark (*Indian J. Chem.* 1974, *12*, 518); 6a,12a-dehydrodalpanol and milldurone from seeds (*Indian J. Chem.* 1975, *13*, 425); 8C-glucopyranosylprunetin along with 7-O-rutinosides of biochanin A and formononetin isolated from bark (*Phytochemistry* 1976, *15*, 1025); triacontane and a new glucoside - caviunin-7-O-glucoside - isolated from roots (*J. Indian Chem. Soc.* 1979, *56*, 81).

Distribution : Plains of southern and western India.

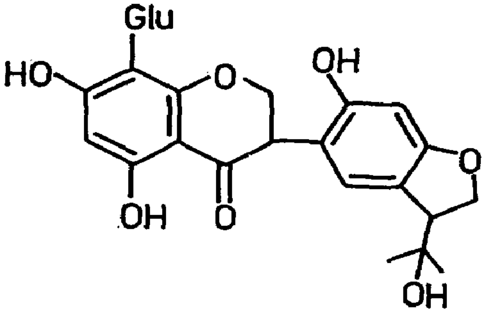
NEW COMPOUNDS



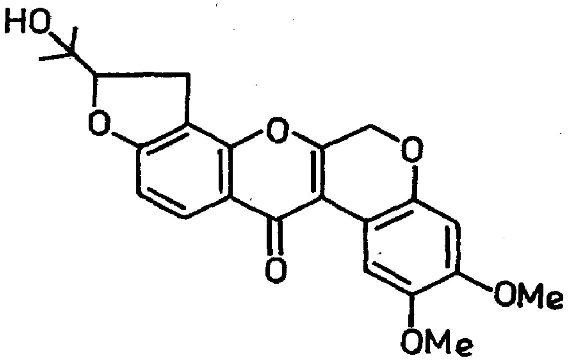
Dalpanol-O-glucoside



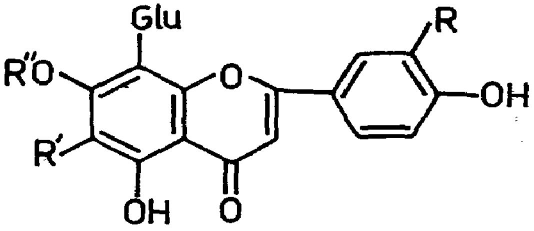
Dalpatin
R = Glu
Dalpatien
R = H



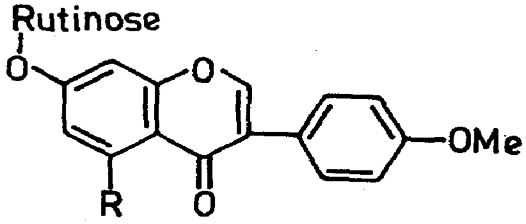
Dalpanin



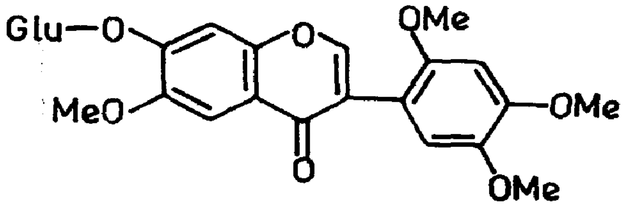
6α,12α-Dehydrodalpanol



8C-Glucosylprunetin
R, R′ = H, R″ = Me
Dalpanitin
R = OMe, R′, R″ = H
Paniculatin
R, R″ = H, R′ = Glu



I
R = OH
II
R = H



Caviunin-7-O-glucoside

D. sericea G. Don syn. *D. hireina* Wall. ex Benth., *D. stenocarpa* Kurz

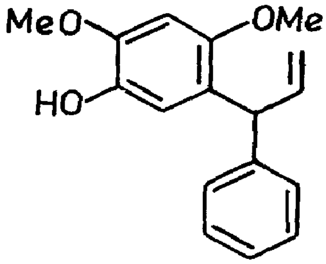
Tirucallol acetate, glutinol, β-sitosterol and taraxerol from stem bark (*Curr. Sci.* 1974, *43*, 75; *Phytochemistry* 1976, *15*, 226); erythrodiol, betulin, baptigenin, 7-hydroxy-6-methoxy-3',4'-methylenedioxyisoflavone, isoliquiritigenin, liquiritigenin, sucrose and sitosterol glucoside isolated (*Phytochemistry* 1976, *15*, 226); ψ-baptigenin, quercetin, hyperin, aromadendrin-3-glucoside and quercetin-3-digalactoside from leaves (*Planta Med.* 1977, *31*, 245).

Distribution : Himalayas from Garhwal to Bhutan, ascending to 1200 m.

D. sissoo Roxb. ex DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 146).

5,7,4'-Trihydroxy-8-methoxyisoflavone (isotectorigenin) from bark (*Indian J. Chem.* 1974, *12*, 1118); a new allylphenol of latifolin type - dalbergiphenol, bp. 154°/0.3 mm - isolated from heartwood along with dalbergenone,dalbergin and methyldalbergin (*Indian J. Chem.* 1974, *12*, 10).

NEW COMPOUNDS



Dalbergiphenol

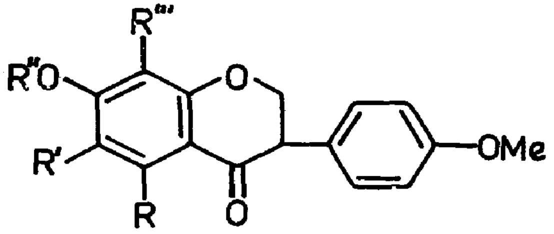
D. stenocarpa Kurz; see *D. sericea* G. Don

D. volubilis Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 90).

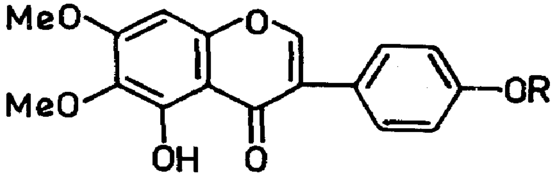
A glycosidic substance from leaves showed anti-inflammatory and antiarthritic activities and a new level of general toxicity (*Indian J. Med. Res.* 1975, *63*, 93).

A new isoflavone C-rhamnoside - isovolubilin - isolated from flowers (*Indian J. Chem.* 1975, *13*, 444; *Phytochemistry* 1976, *15*, 235); new isoflavone C-glycoside - volubilinin, mp. 159° - and biochanin A from flowers (*Phytochemistry* 1976, *15*, 235); β-sitosterol, triacontane, myricyl alcohol, biochanin A, formononetin, tectorigenin and 7-hydroxy-4-methylcoumarin from leaves; tectorigenin also isolated from stem bark (*Indian J. Chem.* 1977, *15*B, 492; *ibid.* 1978, *16*B, 78); tectorigenin-7-gentiobioside isolated from stem bark and its structure determined (*Phytochemistry* 1978, *17*, 596); two new glycosides - 7-O-methyltectorigenin-4'-O-β-D-glucoside (I) and 7-O-methyltectorigenin-4'-O-β-D-glucopyranosyl(1→6)-β-D-glucopyranoside (II) - isolated from stem bark and characterised (*Indian J. Chem.* 1978, *16*B, 641); cearoin and (+)medicarpin along with dalbergin, 7-O-methyltectorigenin and tectoridin from stem bark (*Indian J. Chem.* 1978, *16*B, 78).

NEW COMPOUNDS



Isovolubilin
R,R''' = H, R' = Rha, R'' = Me
Volubilinin
R = OH, R' = OMe, R'' = H, R''' = Glu



I
R = Glu
II
R = Glu(6→1)Glu

DAPHNE (Thymelaeaceae)

D. acuminata Stocks; see *D. mucronata* Royle

D. cannabina Hook.f.; see *D. papyracea* Wall. ex Steud.

D. mucronata Royle syn. *D. oleoides* Hook.f. (non Schreb.), *D. acuminata* Stocks (*Glossary Indian Med. Plants*, Chopra, Nayar, & Chopra, PID, New Delhi, 1956, p. 90).

Methanolic extract possessed hypotensive and cardiotoxic properties (*Planta Med.* 1977, *31*, 119).

β-Sitosterol, sucrose, two unidentified substituted dihydroxycoumarins and daphnetin-8-β-glucoside isolated from plant (*Planta Med.* 1977, *31*, 119); identification of daphnin and daphnetin-8-β-glucoside isolated earlier (*Planta Med.* 1978, *33*, 403); β-sitosterol, α-amyrin, lupeol and an unidentified fatty alcohol from leaves (*J. Indian Chem. Soc.* 1979, *56*, 437).

D. oleoides Hook.f.; see *D. mucronata* Royle

D. papyracea Wall. ex Steud. syn. *D. cannabina* sensu Hook.f., p.p.

Daphnetin and daphnetin-8-β-glucoside isolated (*J. Pharm. Sci.* 1973, *62*, 1359); taraxerol and its acetate, taraxerone, genkwanin, daphnetin and β-sitosterol-D-glucoside from aerial parts (*Indian J. Chem.* 1979, *18*B, 189).

Distribution : Western Himalayas.

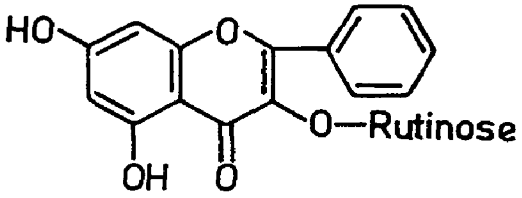
DATISCA (Datiscaceae)

D. cannabina L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 147).

Alcoholic extract of flowers exhibited sedative activity at 100 mg/kg, i.p., in rats; ED50 for anti-inflammatory activity in different test systems ranged between 44 and 100 mg/kg, i.p.; LD50 was 250 mg/kg, i.p. in rats (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 53).

5,7-Dihydroxyflavone-3-O-(α-L-rhamnopyranosyl(1→6)-β-D-glucopyranoside (galangin-3-rutinoside, galanginoside) and isalpinin-3-rutinoside (cannabin) isolated (*Khim. Prir. Soedin.* 1974, *10*, 790; *Chem. Abstr.* 1975, *82*, 152139 h); 2',3,5-trihydroxy-7-methoxyflavone, mp. 235° (datin), 2',5-dihydroxy-7-methoxyflavone-3-O-β-D-glucopyranosyl(1→6)-α-L-rhamnopyranoside, mp. 188° (datinoside), galangin, isalpinin, datiscetin, galanginoside, cannabin, datiscin and datinate-CM (datinate Ca & Mg), isolated from roots (*Khim. Prir. Soedin.* 1974, *10*, 788; *Chem. Abstr.* 1975, *82*, 135689 v; *Rastit. Resur.* 1976, *12*, 237; *Chem. Abstr.* 1976, *85*, 59588 f).

NEW COMPOUNDS



Galanginoside

DATURA (Solanaceae)

D. arborea L.

In tropine alkaloids of leaf, ratio of atropine/scopolamine was 0.08 (*Shoyakugaku Zasshi* 1978, *32*, 199; *Chem. Abstr.* 1979, *91*, 9405 x).

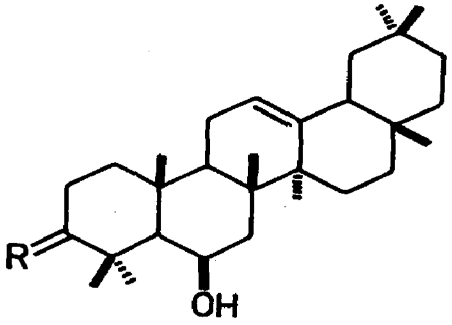
Distribution : Grown in gardens and runs wild in hill stations.

D. fastuosa L.; see *D. metel* L.

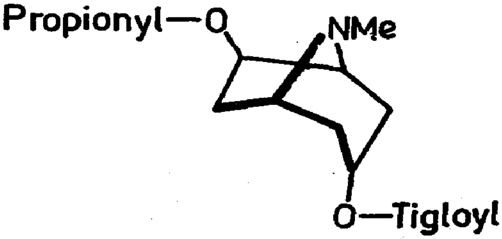
D. innoxia Mill. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 147).

Scopolamine level in roots was high during flowering (~0.55%), decreased at beginning of fruit - bearing (0.30%) and increased again; scopolamine content in stems and leaves was lower. Root contained about 0.3% atropine which decreased slightly at end of flowering. In stems atropine was high (0.11-0.18%)during initial and final stages of fruit - bearing period (*Diss. Pharm. Pharmacol.* 1972, *24*, 307; *Chem. Abstr.* 1972, *77*, 85746 k); two new pentacyclic triterpenes - daturadiol and daturaolone - from seeds and their structures elucidated (*J. Org. Chem.* 1973, *38*, 3685); a new alkaloid - 6β-propionyloxy-3α-tigloyloxytropane (I) - isolated from roots and characterised (*Phytochemistry* 1974, *13*, 1249); method of separation of scopolamine from tropine alkaloids (Pol. 87,677(1976) Nov. 30; *Chem. Abstr.* 1977, *87*, 90721 j).

NEW COMPOUNDS



Daturadiol
R = β-OH,H
Daturaolone
R = O



I

BIOLOGICAL ACTIVITY

Scopolamine (5,8 or 10 μg/kg), given i.v. in man mainly impairs acquisition of new information but has less effect on retrieval of information (*Psychopharmacology* 1977, *52*, 283; *Chem. Abstr.* 1977, *87*, 78564 c).

D. metel L. syn. *D. fastuosa* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 148).

3α,6β-Ditigloyloxytropane, 3α,6β-ditigloyloxytropan-7β-ol, tigloidine, apohyoscine, hyoscine, 3α-tigloyloxytropane, norhyoscine, meteloidine, hyoscyamine, cuscohygrine and tropine from roots (*Bangladesh Pharm. J.* 1973, *2*, 25; *Chem. Abstr.* 1974, *80*, 57429 c); β-sitosterol, scopolamine and fastusine from pericarp (*Bangladesh J. Sci. Ind. Res.* 1974, *9*, 79; *Chem. Abstr.* 1975, *82*, 28529 w); triterpene - daturanolone - isolated and found identical to daturaolone (*Indian J. Chem.* 1976, *14*B, 1007); daturaolone and daturadiol from fruits; structure of latter compound determined (*Indian J. Pharm.* 1977, *39*, 119; *J. Bangladesh Acad. Sci.* 1977, *1*, 71; *Chem. Abstr.* 1978, *88*, 23191 u); scopolamine, hyoscyamine and a mixture of two unidentified alkaloids from leaves (*J. Nat. Res. Counc. Thailand* 1978, *10*, 77; *Chem. Abstr.* 1979, *91*, 105206 d); seed oil yielded 4α-methylsterols-31-norlanost-9(11)enol(2.0), 31-norcycloartenol(6.0), cycloeucalenol (4.0), 31-norlanost-8-enol (1.0), 31-norlanosterol (2.0), obtusifoliol (73.0), 4α-methylcholesta-8-enol (2.0), lophenol (3.0) and citrostadienol (3.0%) (*Phytochemistry* 1978, *17*, 971).

BIOLOGICAL ACTIVITY

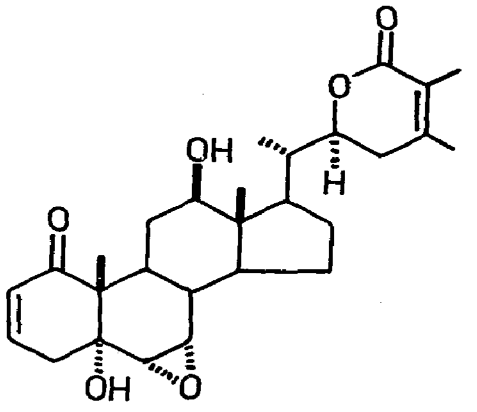
Atropine, hyoscine and total alkaloids (100 μg/ml, each) caused 9,14.7 and 15.2% inhibition of MAO and 8,9.3 and 8.9% inhibition of 5-hydroxytryptophan (5-HTP) decarboxylase respectively (*Indian J. Med. Sci.* 1970, *24*, 13); an increase in locomotor activity produced by morphine HCl (5 mg/kg, s.c. in rats) was inhibited by pretreatment with atropine, methylatropine, scopolamine or methoscopolamine; hyperactivity induced by metham-

phetamine HCl (1 mg/kg, s.c.), caffeine (30 mg/kg, s.c.) or cocaine HCl (10 mg/kg, s.c.) was augmented by atropine or scopolamine (*Neuropharmacology* 1977, *16*, 115; *Chem. Abstr.* 1977, *87*, 62493 t).

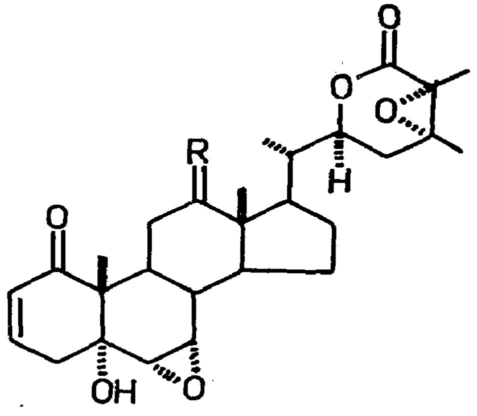
D. quercifolia H.B. & K. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 148).

A new withanolide - daturalactone, mp. 261° - isolated from leaves (*Phytochemistry* 1973, *12*, 476); 12-oxowithanolide isolated (*Phytochemistry* 1976, *15*, 339); leaf alkaloids found similar to those of other *Datura* species. Plant contained more scopolamine in aerial parts than *D. stramonium* (*Quart. J. Crude Drug Res.* 1977, *15*, 131; *Chem. Abstr.* 1978, *88*, 86066 c); isolation and structure of novel withanolide - daturalactone-3, mp 286° - from leaves (*Phytochemistry* 1979, *18*, 283); revised structures of daturalactone (5α,12α-dihydroxy-1-oxo-6α,7α,24α,25α-diepoxy, 20S, 22R-with-2-enolide) and 12-oxowithanolide (*Phytochemistry* 1979, *18*, 637); another withanolide - daturalactone-4, mp. 282° - isolated and structure assigned (*Phytochemistry* 1979, *18*, 1756).

NEW COMPOUNDS



Daturalactone-3



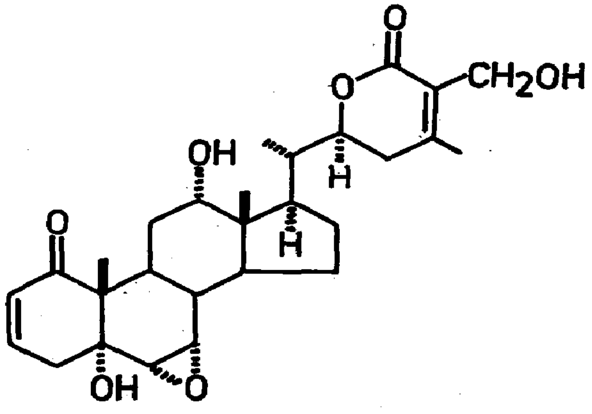
Daturalactone
R = H,αOH,
Daturalactone-4
R = H,H
12-Oxowithanolide
R = O

D. stramonium L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 148).

Components of polar flavonoid glycosides determined; sugar portion consisted mainly of glucose-glucose and glucose- galactose; some glycosides also present as acetyl derivatives of caffeic, p-coumaric and ferulic acids (*Pharm. Acta Helv.* 1970, *45*, 153; *Chem. Abstr.* 1970, *72*, 118454 r); hyoscine N-oxide from seeds, roots, leaves and stems (*J. Pharm. Pharmacol.* 1973, *25*, 116; *Chem. Abstr.* 1974, *80*, 130477 y); leaves yielded β-sitosterol, stigmasterol, campesterol, withanolide 1, mp. 258° (daturalactone) and stramonolide, mp. 265° (*Khim. Prir.*

Soedin. 1976, *12*, 670; *Chem. Abstr.* 1977, *86*, 117600 n); triterpene alcohols - lanost-8-en-3β-ol (2.0), lanosterol (tr) and 24-methylenelanost-8-en-3β-ol (tr) in addition to cycloartanol (tr), cycloartenol (34.0), 24-methylenecycloartanol (7.0), lupeol (2.0), β-amyrin (53.0%), daturaolone (tr) and daturadiol (tr) - identified in seeds (*Phytochemistry* 1977, *16*, 1723); total alkaloids 0.25-0.34% in aerial parts; hyoscyamine, hyoscine, skimmianine, tropine and 2,6-dihydroxytropane isolated (*Khim. Prir. Soedin.* 1977, *13*, 126; *Chem. Abstr.* 1977, *87*, 50201 h; *Dokl. Akad. Nauk Todzh. SSR* 1978, *21*, 34; *Chem. Abstr.* 1979, *90*, 51420 c); detection of cholesterol, cholest-7-enol, campesterol, 24-methylenecholesterol, stigmasterol, sitosterol, 28-isofucosterol, 31-norlanosterol, obtusifoliol, 31-norcycloartenol, cycloeucalenol, gramisterol, citrostadienol, lanost-8-enol, cycloartanol, lanosterol, β-amyrin, lupeol and 24-methylenecycloartanol in seed oil by GLC and TLC (*Hanguk Nonghwa Hakhoe Chi* 1978, *21*, 51; *Chem. Abstr.* 1979, *90*, 100109 u); hyoscyamine, hyoscine and atropine from stems and seeds (*Dokl. Akad. Nauk Todzh. SSR* 1978, *21*, 34; *Chem. Abstr.* 1979, *90*, 51420 c); isolation and structure of new withanolide - withastramonolide - from leaves (*Khim. Prir. Soedin.* 1978, *14*, 91; *Chem. Abstr.* 1978, *89*, 43962 v); four 4α-methylsterols - 31-norlanost-9(11)-enol (1.0), 24-methyl-31-norlanost-9(11)-enol (tr), 4α,24-dimethylcholesta-7,24-dienol (tr) and 31-norcycloartanol (tr) - along with 31-norcycloartenol (6.0), cycloeucalenol (9.0), 31-norlanost-8-enol (tr), 31-norlanosterol (2.0), obtusifoliol (13.0), 4α,14α,24-trimethylcholesta-8,24-dienol (tr), 4α-methylcholesta-8-enol (1.0), lophenol (6.0), 24-methyllophenol (tr), 24-ethyllophenol (tr), gramisterol (43.0) and citrostadienol (13.0%) isolated from seed oil (*Phytochemistry* 1978, *17*, 971).

NEW COMPOUNDS



Withastramonolide

D. suaveolens Humb. & Bonpl. ex Willd. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 148).

3α,6β-Ditigloyloxytropan-7β-ol, 6β-tigloyloxytropan-3α,7β-diol, 3α-tigloyloxytropan-6β,7β-diol (meteloidine) and (-) and (±)3α-tigloyloxytropan-6β-ol isolated from aerial parts along with hyoscine, apohyoscine, norhyoscine, atropine and noratropine; roots contained hyoscine, tropine, atropine, meteloidine, littorine, 3α-acetoxytropane, 6β-(α-methyl-

butyryloxy)-3α-tigloyloxytropane, 3α,6β-ditigloyloxytropane-7β-ol and cuscohygrine (*Phytochemistry* 1972, *11*, 3293).

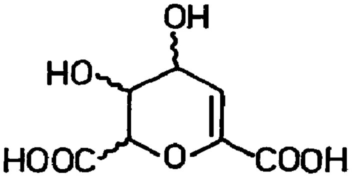
DAUCUS (Apiaceae)

D. carota L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 148).

Various chromatographic fractions of seed extract showed antizygotic and/or blastocystotoxic activity in female rats (*Indian J. Pharmacol.* 1975, *7*, 40); alcoholic extract of seed showed significant (80%) anti-implantation activity in rats (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 129); a tertiary base from seeds showed non-specific smooth muscle relaxant and spasmolytic activity which was about one-tenth that of papaverine (*Indian J. Physiol. Pharmacol.* 1979, *23*, 225).

Daucic acid isolated (*Nature* 1971, *232*, 423); synthesis of (-)daucene from (+)limonene (*Chem. Commun.* 1972, 606); total synthesis of (+)daucene,(+)carotal and daucol (*Chem. Commun.* 1972, 855); essential oils from red, black and yellow carrot seeds contained α-pinene (1.15, 0.45, 0.3), camphene (0.08, tr, 0), myrcene (1.4, 2.5, 0.1), car-3-ene (0.3, 1.2, 0),limonene (2.0, 3.1, 1.2), β-bisabolene (7.25, 7.53, 3.52), β-caryophyllene (2.14, 1.34, 0), β-selinene (4.10, 3.15, 2.95), carotol (62.8, 64.9, 77.52) and daucol (1.5,0,3.91%) respectively (*Pakistan J. Sci. Ind. Res.* 1977, *20*, 103; *Chem. Abstr.* 1979, *90*, 138042 e); α-humulene, β-farnesene and α-bergamotene identified in volatile oil of roots by GLC (*J. Agric. Food Chem.* 1978, *26*, 181; *Chem. Abstr.* 1978, *88*, 71419 w).

NEW COMPOUNDS



Daucic acid

DAVALLIA (Davalliaceae)

D. divaricata Blume

Davallic acid, 24-norferna-4(23),9(11)-diene and hop-21-ene isolated (*Shoyakugaku Zasshi* 1978, *32*, 260; *Chem. Abstr.* 1979, *91*, 96562 n).

Distribution : North-east India.

D. griffithiana Hook.; see *Humata griffithiana* (Hook.) C. Chr.

D. solida (Forst.) Sw.

19-α-Hydroxyfernene and 19α-hydroxyfilic-3-ene isolated (*Shoyakugaku Zasshi* 1978, *32*, 260; *Chem. Abstr.* 1979, *91*, 96562 n).

Distribution : Eastern Himalayas

DELONIX (Caesalpiniaceae)

D. elata (L.) Gamble syn. *Poinciana elata* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 149).

Bark yielded L(-)asparagine, aspartic acid, β-amyrin and β-sitosterol-β-D-glucopyranoside (*Curr. Sci.* 1969, *38*, 460).

D. regia (Boj. ex Hook.) Rafin. syn. *Poinciana regia* Boj. ex Hook. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 150).

Both aqueous and alcoholic extracts of flowers were active against roundworm, Haemonchus contortus (*Indian J. Pharm.* 1971, *33*, 74); aqueous extract of bark showed emetic and CNS depressant effects in cat and monkey (*Herba Pol.* 1972, *18*, 160; *Chem. Abstr.* 1973, *78*, 13768 s).

Hentriacontane, β-sitosterol and its glucoside, hentriacontanol, protocatechuic acid and quercetin from flowers (*Indian J. Pharm.* 1971, *33*, 74); erythritol and a long chain hexahydroxyalcohol from bark (*Herba Pol.* 1972, *18*, 160; *Chem. Abstr.* 1973, *78*, 13768 s).

DELPHINIUM (Ranunculaceae)

D. ajacis L.; see *Consolida ambigua* (L.) Ball. & Heywood

D. denudatum Wall. ex Hook.f. & Thoms. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 150).

Diterpenoid alkaloid condelphine from root (*Proc. Nat. Acad. Sci.* India 1969, *39*A; 233; *Chem. Abstr.* 1970, *73*, 17445 p).

D. elatum L.; see *D. vestitum* Wall. ex Royle

D. speciosum Janka ex Nym.; see *D. vestitum* Wall. ex Royle

D. vestitum Wall. ex Royle syn. *D. elatum* auct. (non L.), *D. speciosum* Janka ex Nym. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 92).

Flavonoid content 0.58-2.5% (*Soobshch. Akad. Nauk Gruz. SSR* 1976, *84*, 369; *Chem. Abstr.* 1977, *86*, 86154 p).

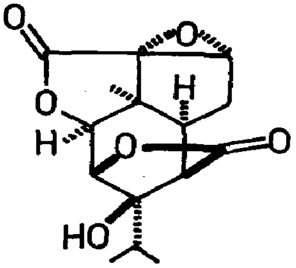
DENDROBIUM (Orchidaceae)

D. aduncum Wall.

Isolation and structure of a sesquiterpene - aduncin (*Phytochemistry* 1976, *15*, 1991).

Distribution : Sikkim, Bhutan and hills of north-eastern India, alt. 2100 m.

NEW COMPOUNDS



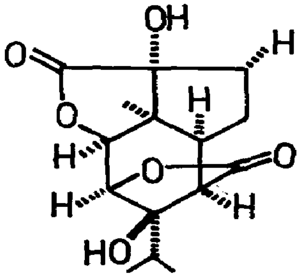
Aduncin

D. amoenum Wall. ex Lindl.

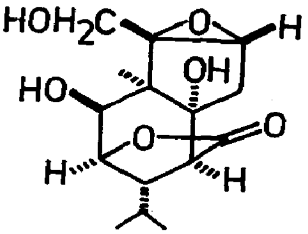
Structures of two sesquiterpenes - amotin and amoenin - determined (*Phytochemistry* 1978, *17*, 1949).

Distribution : Himalayas from Garhwal to Bhutan, alt. 1000-1500 m.

NEW COMPOUNDS



Amotin



Amoenin

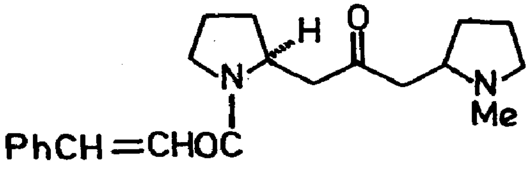
D. aphyllum (Roxb.) G.E.C. Fischer syn. *D. pierardii* Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 151).

Structures of pierardine and trans-dendrochrysine confirmed by synthesis (*Chem. Commun.* Univ. Stockholm 1973, 28; *Chem. Abstr.* 1973, *79*, 53642 y).

D. chrysanthum Wall. ex Lindle. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 151).

Two new alkaloids - cis- and trans-dendrochrysine - isolated and their structures elucidated (*Acta Chem. Scand.* 1973, *27*, 1982).

NEW COMPOUNDS



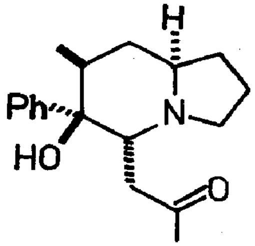
Dendrochrysine

D. crepidatum Lindl. & Paxt.

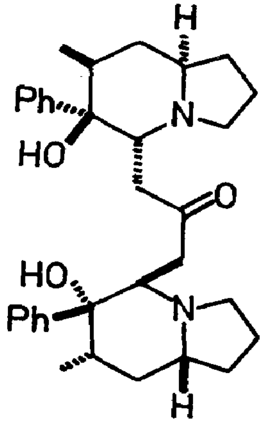
Isolation and structure elucidation of three alkaloids - crepidine, crepidamine and dendrocrepine; isocrepidamine and isodendrocrepine found to be artefacts (*Acta Chem. Scand.* 1973, *27*, 1907).

Distribution : Himalayas, Nepal, Sikkim, Assam and south India.

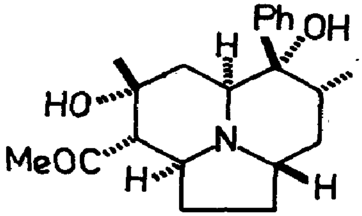
NEW COMPOUNDS



Crepidamine



Dendrocrepine

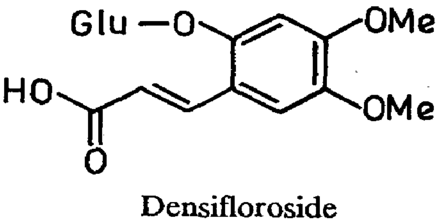


Crepidine

D. densiflorum Lindl. syn. *D. thrysiflorum* Reichb.f. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 151).

New glycoside - densifloroside - characterised as 2-(β-D-glucopyranosyloxy)-4,5-dimethoxy-trans-cinnamic acid; its cis isomer also isolated (*Acta Chem. Scand.* 1975, *29*B, 627).

NEW COMPOUNDS

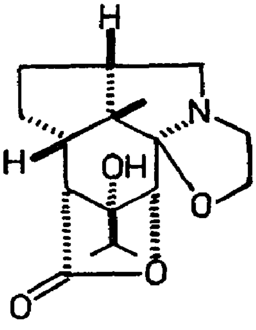


Densifloroside

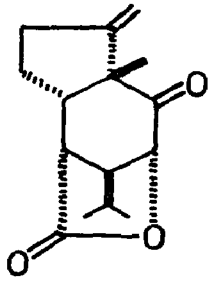
D. nobile Lindl. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 151).

Dendrine synthesised from dendrobine and its absolute configuration determined (*Acta Chem. Scand.* 1970, *24*, 1108); total synthesis of (±)dendrobine (*J. Am. Chem. Soc.* 1972, *94*, 8278); isolation and structures of 4-hydroxydendroxine and nobilomethylene (*Chem. Pharm. Bull.* 1972, *20*, 418); five quaternary compounds - N-methyldendrobinium iodide, N-isopentyldendrobinium bromide, dendrobine N-oxide, N-isopentenyldendroxinium chloride and N-isopentenyl-6-hydroxydendroxinium chloride - isolated (*Acta Chem. Scand.* 1972, *26*, 3177).

NEW COMPOUNDS



4-Hydroxydendroxine



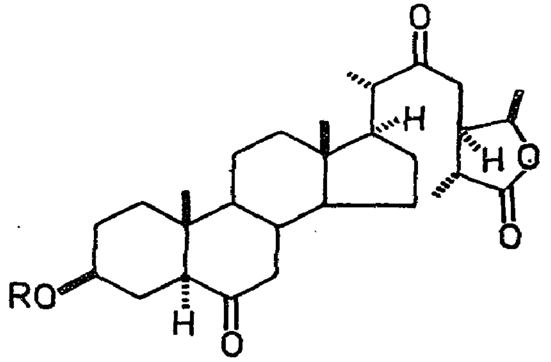
Nobilomethylene

D. ochreatum Lindl.

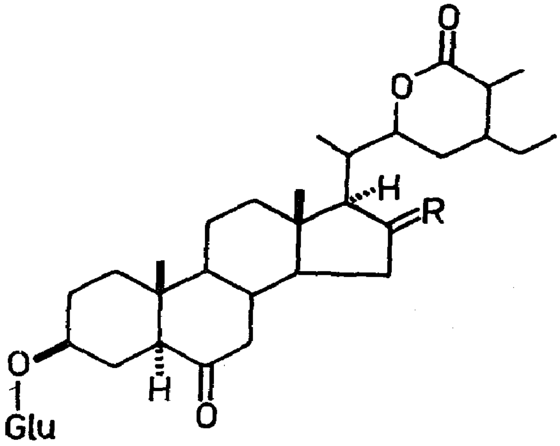
Three glycosides isolated; one of them - dendrosteroside - comprised of dendrosterone and two glucose units connected by 1→6 linkage (gentiobiose); crystal structure of dendrosterone elucidated by X-ray (*Acta Chem. Scand.* 1975, *29B*, 401; *Phytochemistry* 1976, *15*, 1403); structures of other two glycosides - ochreasteroside and epiochreasteroside - determined (*Phytochemistry* 1976, *15*, 1403).

Distribution :Khasia and Jaintia Hills in Meghalaya.

NEW COMPOUNDS



Dendrosteroside
R = gentiobiose



Ochreasteroside
R = β-OH,H
Epiochreasteroside
R = α-OH,H

D. pierardii Roxb.; see *D. aphyllum* (Roxb.) G.E.C. Fischer

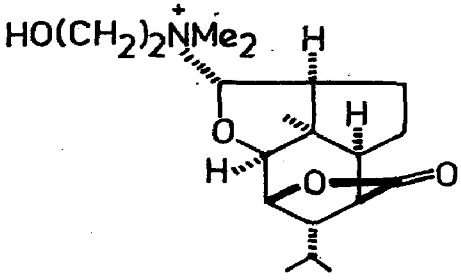
D. thrysiflorum Reichb. f.; see *D. densiflorum* Lindl.

D. wardianum Warner

A new quaternary alkaloid - dendrowardine - isolated and structure determined (*Acta Chem. Scand.* 1973, *27*, 1439).

Distribution : Meghalaya.

NEW COMPOUNDS



Dendrowardine

DENDROPTHOE (Loranthaceae)

D. falcata (L.f.) Etting. syn. *Loranthus longiflorus* Desr. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 93).

β-Amyrin acetate, β-sitosterol, stigmasterol, oleanolic acid and its methyl ester acetate from stems (*Curr. Sci.* 1977, *46*, 850).

DERRIS (Papilionaceae)

D. brevipes Baker

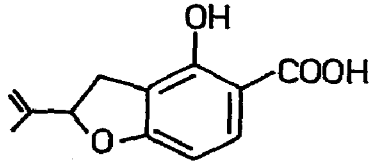
Damnacanthal, rotenone and β-sitosterol isolated from stem (*Indian J. Chem.* 1977, *15*B, 291).

Distribution : Lower Western Ghats, Mysore and the Nilgiris.

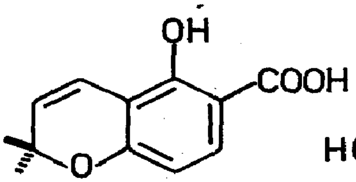
D. elliptica (Wall.) Benth. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 153).

Tubaic and β-tubaic acids isolated from roots and characterised (*Agric. Biol. Chem.* 1976, *40*, 1245; *Chem. Abstr.* 1976, *85*, 74961 r); a new imino alcohol - 2,5-dihydroxymethyl-3,4-dihydroxypyrrolidine (I) - isolated from leaves (*Phytochemistry* 1976, *15*, 747).

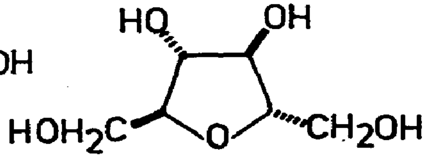
NEW COMPOUNDS



Tubaic acid



β-Tubaic acid



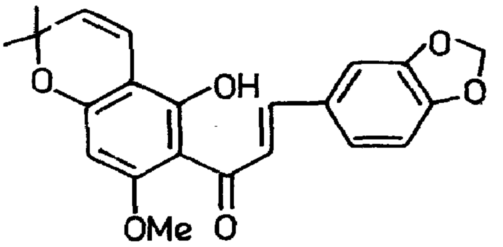
I

D. indica (Lamk.) Bennet syn. *Pongamia glabra* Vent., *P. pinnata* (L.) Pierre (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 153).

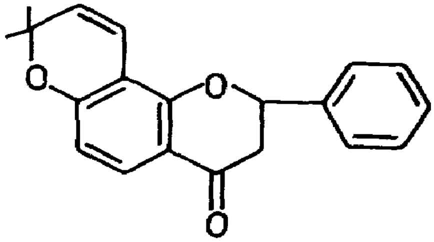
Tetra-O-methylfisetin and pongachromene isolated from root and stem bark (*Indian J. Chem.* 1969, *7*, 1275; *Curr. Sci.* 1973, *42*, 128; *Indian J. Chem.* 1977, *15*B, 12); isolation, structure

elucidation and synthesis of a new chromonochalcone - glabrachromene (*Indian J. Chem.* 1972, *10*, 585; *Curr. Sci.* 1973, *42*, 128; *Indian J. Chem.* 1977, *15*B, 12); (-)isolonchocarpin and demethoxy kanugin isolated from seed oil (*Indian J. Chem.* 1973, *11*, 209; *Curr. Sci.* 1973, *42*, 128; *Indian J. Chem.* 1977, *15*B, 12); pongachalcone-1 along with kanugin, pongaglabrone and β-sitosterol isolated from heartwood (*Curr. Sci.* 1973, *42*, 128; *Indian J. Chem.* 1977, *15*B, 12); a new flavone - karanjachromene (pongajflavone) - isolated from stems and seed oil (*Indian J. Chem.* 1973, *11*, 1188, *ibid*; 1974, *12*, 8); karanjin, pongapin and pongamol also isolated from stems (*Indian J. Chem.* 1974, *12*, 8); a review on chemical constituents and uses of plant (*J. Sci. Ind. Res.* 1976, *35*, 608); a new furanoflavone - 3′-methoxypongapin - in addition to karanjin, kanjone and its two isomers 7-methoxyfurano-(4″,5″,-6,5)-flavone and 8-methoxyfurano-(4″,5″-6,7)-flavone isolated from leaves (*Indian J. Chem.* 1976, *14*B, 229; *ibid.* 1977, *15*B, 536); a new β-diketone (I) isolated from seeds and its structure determined (*Indian J. Chem.* 1977, *15*B, 866); lonchocarpin, pongachalcones-I and II, glabrachromene-II and glabrachromene isolated from heartwood (*Indian J. Chem.* 1977, *15*B, 12); pongamol, karanjin, pongapin, pinnatin and kanjone isolated from seed shells (*Curr. Sci.* 1977, *46*, 743; *Indian J. Chem.* 1977, *15*B, 1138); a new chromenoflavone - isopongaflavone - isolated and characterised along with lanceolatin-B (*Indian J. Chem.* 1977, *15*B, 1138).

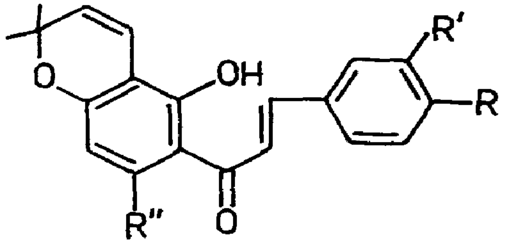
NEW COMPOUNDS



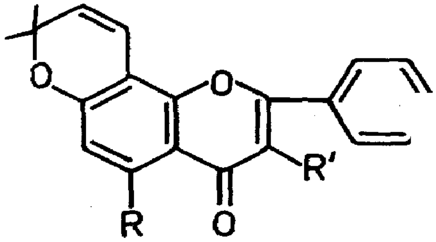
Glabrachromene



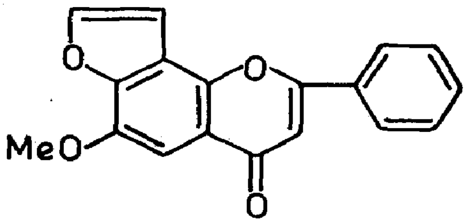
Isolonchocarpin



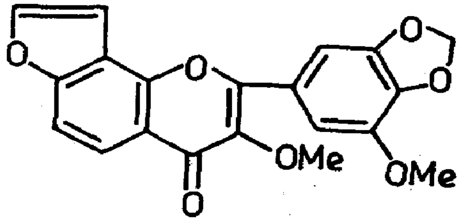
Glabrachromene II
RR′ = -OCH₂O-, R″ = H
Pongachalcone I
R,R′ = H, R″ = OMe
Pongachalcone II
R = OH, R′ = OMe, R″ = H



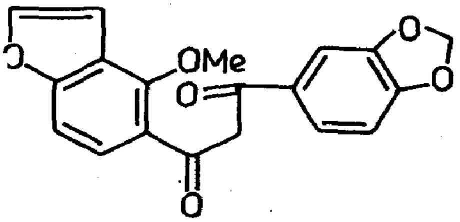
Isopongaflavone
R = OMe, R′ = H
Karanjachromene
R = H, R′ = OMe



Kanjone



3-Methoxypongapin



I

D. robusta Benth. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 154).

Synthesis of robustic acid (*C. R. Acad. Sci.* Ser. C 1970, *270*, 1422; *Chem. Abstr.* 1970, *73*, 55993 p); 5-hydroxy-7-methoxyisoflavone from seeds (*Planta Med.* 1979, *36*, 379).

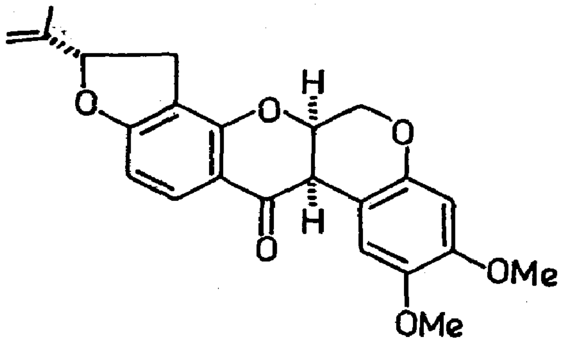
D. scandens (Roxb.) Benth. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 154).

A neutral straight chain saturated compound, lupeol, taraxerol and β-sitosterol isolated (*J. Indian Chem. Soc.* 1971, *48*, 95).

D. trifoliata Lour. syn. *D. uliginosa* Benth. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 94).

Dehydrorotenone, lupeol and a straight chain ketone from roots (*Indian J. Chem.* 1976, *14*B, 1012).

NEW COMPOUNDS



Dehydrorotenone

D. uliginosa Benth.; see *D. trifoliata* Lour.

DESCURAINIA (Brassicaceae)

D. sophia (L.) Webb. ex Prantl syn. *Sisymbrium sophia* L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 155).

Isorhamnetin, β-sitosterol and helioscopiol found in plant (*Pakistan J. Sci. Ind. Res.* 1970, *12*, 505; *Chem. Abstr.* 1970, 73, 119190 k).

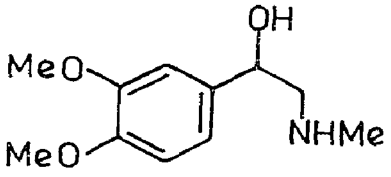
DESMODIUM (Papilionaceae)

D. cephalotes (Roxb.) Wt. & Arn.; see *D. triangulare* (Retz.) Merr.

D. elegans DC. ssp. *elegans* var. *elegans* syn. *D. tiliaefolium* (D. Don) Wall. ex G. Don (tiliifolium) p.p., *D. oxyphyllum* Baker (non DC.), *D. oxyphyllum* Baker var. *serriferum* Baker (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 94).

n-Aliphatic alcohols, wax esters (major hexacosanyl eicosanoate), sitosterol and n-aliphatic wax acids (major octacosanoic acid) isolated from leaves (*Phytochemistry* 1972, *11*, 3546); a new alkaloid - N-methyl-3,4-dimethoxy-β-hydroxyphenethylamine (I) - along with tyramine, hordenine, 3,4-dimethoxyphenethylamine, N,N- dimethyl-3,4-dimethoxyphenethylamine, salsoline, salsolidine, tryptamine, abrine and hypaphorine isolated (*Phytochemistry* 1973, *12*, 193).

NEW COMPOUNDS



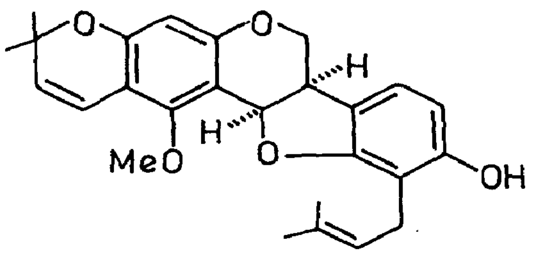
I

D. gangeticum (L.) DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 155).

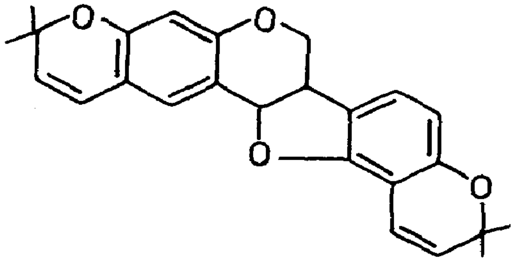
Alkaloids isolated from aerial parts were found responsible for anticholinesterase, smooth muscle stimulant, CNS stimulant and depressor responses in test animals. Tert-β-phenylethylamines and candicine present in roots, responsible for nicotine-like effects on dog intestine in situ and carotid blood pressure (*Planta Med.* 1972, *22*, 434).

A new pterocarpan - gangetin - isolated and characterised as 7α,12α-dihydro-13-methoxy-3,3-dimethyl-11-(3-methyl-2-butenyl)- 3H,7H-benzofuro[3,2-C]pyrano[3,2-g]benzopyran-10-ol (*J. Chem. Soc.* C 1971, 2420); detection of 5 phospholipids in seeds by TLC (*Planta Med.* 1971, *20*, 131); twelve alkaloids of four structural types (carboxylated and decarboxylated tryptamine, β-carbolines and β-phenylethylamines) isolated (*Planta Med.* 1972, *22*, 434); two pterocarpanoids - gangetinin and desmodin - isolated and their structures determined (*Phytochemistry* 1975, *14*, 1129).

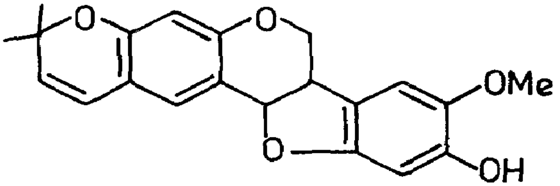
NEW COMPOUNDS



Gangetin



Gangetinin



Desmodin

D. gyrans (L.f.) DC.; see *D. motorium* (Houtt.) Merrill

D. heterocarpon (L.) DC. syn. *D. polycarpum* DC. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 94).

Alcoholic extract showed significant analgesic activity, potentiation of pentobarbitone-induced hypnosis and hypotensive activity (*J. Res. Indian Med.* 1975, *10,* 135).

D. motorium (Houtt.) Merrill syn. *D. gyrans* (L.f.) DC.

Eng.- Telegraph plant, Semaphore plant.

Indole alkaloids - N,N-dimethyltryptamine-Nb-oxide, 5-methoxy-N, N -dimethyltryptamine-Nb-oxide, β-phenylethylamine,bufotenine and choline isolated from leaves; N,N-dimethyltryptamine, its Nb oxide and two unidentified indole-3-alkylamines from roots (*Phytochemistry* 1972, *11,* 1863).

Distribution : All along Himalayas from Kashmir to Assam, ascending to 2100 m, Madhya Pradesh, Maharashtra and Tamil Nadu.

D. oxyphyllum DC.; see *D. elegans* DC. ssp. *elegans* var. *elegans*

D. oxyphyllum Baker var. *serriferum* Baker; see *D. elegans* DC. ssp. *elegans* var. *elegans*

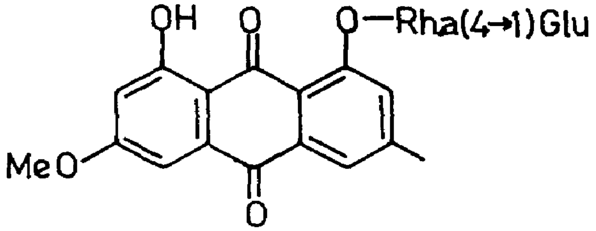
D. polycarpum DC.; see *D. heterocarpon* (L.) DC.

D. pulchellum (L.) Benth. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 156).

A galactomannan obtained from seeds (*Phytochemistry* 1970, *9,* 1881); a new glycoside - physcion-1-glucosylrhamnoside - identified in seed (*Phytochemistry* 1971, *10,* 1921); fifteen indole bases of three types, indole-3-alkylamine, β-carboline and tetrahydro-β-carboline,

including 3-dimethylaminomethyl-indole and 1-methyl-1,2,3,4-tetrahydro-β-carboline isolated from plant (*Planta Med.* 1972, *21*, 398); α-amyrin, betulin and β-sitosterol from roots (*Indian J. Chem.* 1975, *13*, 869).

NEW COMPOUNDS



Physcion-1-glucosylrhamnoside

D. tiliaefolium (D. Don) Wall. ex G. Don (*tiliifolium*) p.p.; see *D. elegans* DC. ssp. ***elegans*** var. *elegans*

D. triangulare (Retz.) Merr. syn. *D. cephalotes* (Roxb.) Wt. & Arn.

Phenethylamine, salsolidine, hordenine, tyramine, candicine and choline from stem and roots, whereas leaves contained only phenethylamine and tyramine (*Phytochemistry* 1974, *13*, 1628).

Distribution : Himalayas, Nepal eastwards ascending to 1200 m and throughout India in plains.

D. triflorum (L.) DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 94).

Leaves are used as remedy for diarrhoea, dysentery and convulsions; roots used for cough and asthma (*Phytochemistry* 1971, *10*, 3312).

Indole-3-acetic acid, tyramine, N,N-dimethyltryptophan, hypaphorine, trigonelline, choline and betaine isolated (*Phytochemistry* 1971, *10*, 3312); four phenethylamines, five indole-3-alkylamines, stachydrine, trigonelline, choline and betaine isolated from roots (*Planta Med.* 1973, *23*, 321).

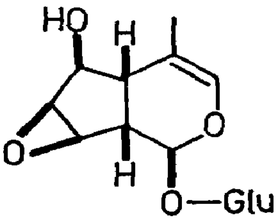
DEUTZIA (Philadelphaceae)

D. scabra Thunb.

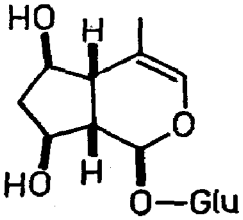
Structure and configuration assigned to deutzioside (5-deoxy scabroside) (*Gazz. Chim. Ital.* 1974, *104*, 17; *Chem. Abstr.* 1974, *81*, 87987 w); a new iridoid glycoside - deutziol - isolated and its structure and configuration determined (*Gazz. Chim. Ital.* 1976, *106*, 57; *Chem. Abstr.* 1976, *85*, 108929 d).

Distribution : Native of China and Japan, cultivated in Indian gardens.

NEW COMPOUNDS



Deutzioside



Deutziol

DICENTRA (Fumariaceae)

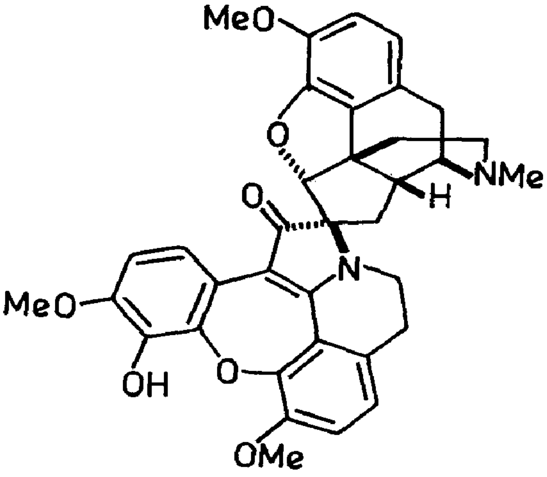
D. canadensis Walp.

Eng. - Squirrel corn.

Structure of cancentrine elucidated (*Can. J. Chem.*1972, *50*, 853).

Distribution : Grown in gardens in hill stations in India.

NEW COMPOUNDS



Cancentrine

D. macrocapnos Prain syn. *D. scandens* auct. (non Walp.)

(-)Stylopine and protopine from leaves and stems (*Indian J. Chem.* 1977, *15*B, 389).

Distribution : Garhwal to Nepal, alt. 750-2000 m.

D. scandens Walp.; see *D. macrocapnos* Prain

DICHROSTACHYS (Mimosaceae)

D. cinerea (L.) Wt. & Arn. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 95).

Friedelin, friedelan-3β-ol and α-amyrin isolated from bark while heartwood yielded octacosanol; leaves yielded hentriacontanol and β-amyrin; sitosterol from bark, heartwood and

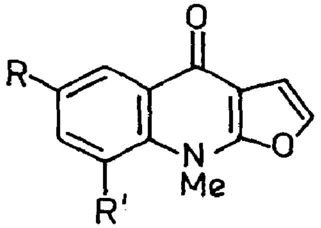
leaves (*Phytochemistry* 1974, *13*, 2010); n-octacosanol, β-amyrin, friedelan-3-one, friedelan-3β-ol and β-sitosterol from roots (*J. Indian Chem. Soc.* 1977, *54*, 649).

DICTAMNUS (Rutaceae)

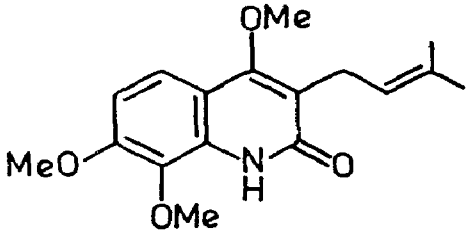
D. albus L. syn. *D. hispanicus* Webb. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 156).

Quinoline alkaloids - isodictamnine and isomaculosidine - isolated from roots (*Herba Hung.* 1971, *10*, 123; *Chem. Abstr.* 1973, *79*, 2768 m; *Tetrahedron* 1973, *29*, 1217); a new alkaloid - preskimmianine - together with sitosterol, limonin and fraxinellone isolated from roots (*Tetrahedron* 1973, *29*, 1217); bergapten, xanthotoxin, skimmianine, β-sitosterol and mixture of α- and β-amyrins isolated (*An. Quim.* 1977, *73*, 430; *Chem. Abstr.* 1977, *87*, 148668 r); bergapten, xanthotoxin and psoralen isolated and aliphatic straight chain saturated acids (C_{14} to C_{32}) identified by GLC in leaves (*An. Quim.* 1977, *73*, 914; *Chem. Abstr.* 1977, *87*, 180680 z).

NEW COMPOUNDS



Isodictamnine
R,R' = H
Isomaculosidine
R,R' = OMe



Preskimmianine

BIOLOGICAL ACITIVITY

Skimmianine (50-200 mg/kg) when orally administered to rats or mice synergised the hypnotic action of chloral hydrate (250 mg/kg), hexobarbital (65 mg/kg), urethane (1.1 g/kg) and ethanol (6 mg/kg). Its oral LD50 value in mice was 1.31 g/kg (*Farmakol. Alkaloidov Ikh Proizvod.* 1972, 47; *Chem. Abstr.* 1974, *80*, 103868 v); skimmianine administered orally to rabbits (200 mg/kg/day) or to rats (50-100 mg/kg/day) for 10-12 days had no effect on peripheral blood indexes or urine composition (*Farmakol. Alkaloidov Ikh Proizvod.* 1972, *55*; *Chem. Abstr.* 1974, *80*, 103869 w).

D. hispanicus Webb.; see *D. albus* L.

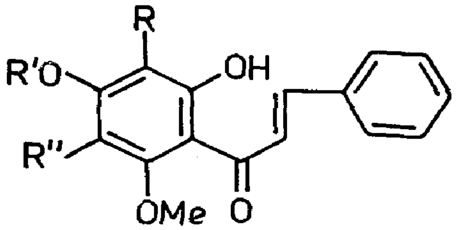
DIDYMOCARPUS (Gesneriaceae)

D. aurentiaca Clarke

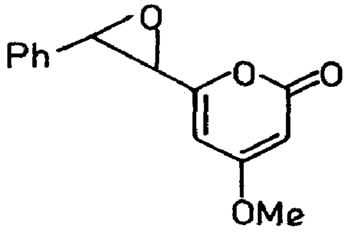
Isolation and structure elucidation of a new chalcone - aurentiacin A (*Plant Biochem. J.* 1965, *2*, 65; *Chem. Abstr.* 1976, *85*, 139726 q); a new 2-pyrone derivative - 7,8-epoxy-5,6-

dehydrokawain - and 5,6-dehydrokawain isolated (*Indian J. Chem.* 1976, *14*B, 127, 909); isolation of a new chalcone aurentiacin and its synthesis (*Phytochemistry* 1976, *15*, 229).
Distribution : Sikkim and Nepal; alt. 600-1200 m.

NEW COMPOUNDS



Aurentiacin
R,R' = Me, R'' = H
Aurentiacin A
R,R' = H, R'' = Me

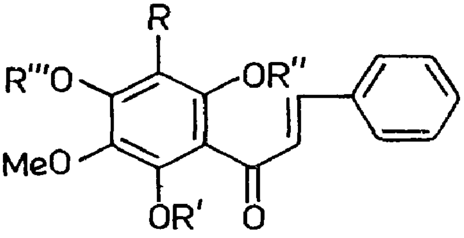


7,8-Epoxy-5,6-dehydrokawain

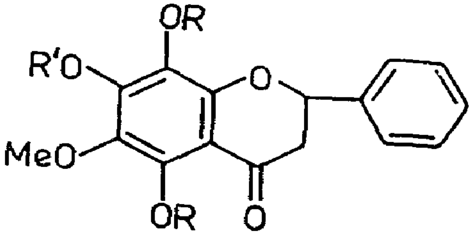
D. pedicellatus R. Br. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 96).

Pedicinin, mp. 203°, and pedicellin, mp. 97°, isolated from leaves (*Rend. Acad. Naz.* 40 [Quaranta] [4] 1968, 311; *Chem. Abstr.* 1970, *72*, 59009 z; *Rend. Acad. Naz.* 40 [Quaranta] [4] 1968, 317; *Chem. Abstr.* 1970, *72*, 55714 c; *Indian J. Chem.* 1973, *11*B, 404); two new compounds - pashanone and methylpedicin - from leaves (*Indian J. Chem.* 1973, *11*, 404); isolation of didymocarpin from leaves and characterisation as 7-hydroxy-5,6,8-trimethoxy-flavanone (*Phytochemistry* 1978, *17*, 587); a new chalcone - isodidymocarpin - from leaves characterised as 2',4'-dihydroxy-3',5',6'-trimethoxychalcone (*J. Indian Chem. Soc.* 1978, *55*, 1198); a new flavanone - didymocarpin A - isolated and its structure elucidated (*Chem. Ind.* 1979, 348).

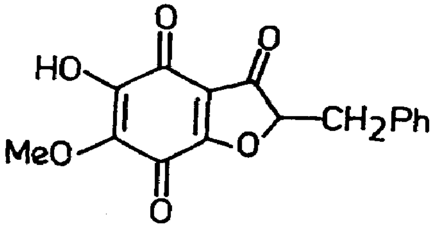
NEW COMPOUNDS



Isodidymocarpin
R = OMe, R' = Me, R'', R''' = H
Methylpedicin
R = OMe, R', R''' = Me, R'' = H
Pashanone
R, R', R'' = H, R''' = Me
Pedicellin
R = OMe, R', R'', R''' = Me



Didymocarpin
R = Me, R' = H
Didymocarpin A
R = H, R' = Me



Pedicinin

DIGERA (Amaranthaceae)

D. arvensis Forsk.; see *D. muricata* (L.) Mart.

D. muricata (L.) Mart. syn. *D. arvensis* Forsk. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 96).

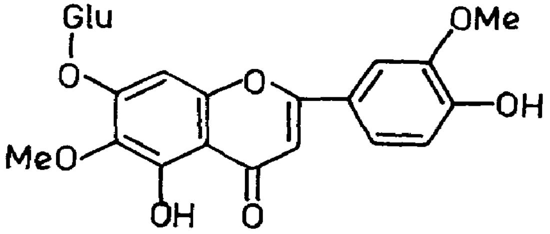
α- And β-spinasterols found in plant (*Plant Biochem. J.* 1977, *4*, 14; *Chem. Abstr.* 1977, *87*, 148715 d).

DIGITALIS (Scrophulariaceae)

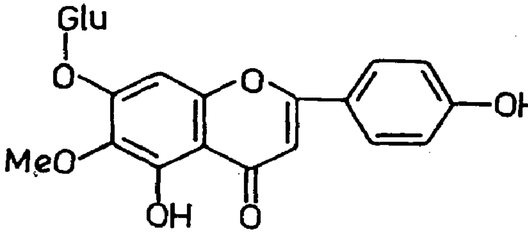
D. lanata Ehrh. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 157).

Lanatosides A,B and C isolated from leaves (*Acta Pharm. Jugoslav.* 1972, *22*, 145; *Chem. Abstr.* 1973, *78*, 75814 n); cholesterol, campesterol, stigmasterol, sitosterol, cycloartenol and 24-methylenecycloartenol isolated (*J. Pharm. Pharmacol.* 1973, *25*, 145); separation of digoxin and dihydrodigoxin by TLC and PC (*J. Chromatogr.* 1976, *125*, 523); luteolin, hispidulin, jaceosidin, chrysoeriol, diosmetin and nepetin isolated from leaves (*Planta Med.* 1977, *32*, 24); new flavonoids - jaceoside (4',5-dihydroxy-3',6-dimethoxyflavone-7-O-β-D-glucopyranoside) and hispidulin-7-glucoside (5,4'-dihydroxy-6-methoxyflavone-7-O-β-D- glucopyranoside) - along with nepitrin and luteolin-7-β-D-glucopyranoside from leaves (*Planta Med.* 1978, *34*, 443); pectolinarigenin, desmethoxycentaureidin and apigenin from leaves (*Planta Med.* 1978, *34*, 225); biosynthesis studies and conversion of lanatoside glycosides in leaf using progesterone-4- ^{14}C (*Proc. Hung. Annu. Meet. Biochem.* 1978, *18*, 143; *Chem. Abstr.* 1979, *90*, 36355 s).

NEW COMPOUNDS



Jaceoside



Hispidulin-7-glucoside

BIOLOGICAL ACTIVITY

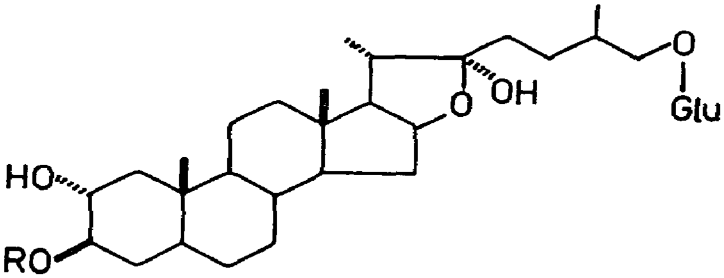
Digoxin (0.50 mg/day for 3 days, p.o.) increased lysophosphatidylcholine and phosphatidylethanolamine concentrations in blood plasma of healthy men indicating possible relation between cardiac action and phospholipid mechanism (*Res. Commun. Chem. Pathol. Pharmacol.* 1972, *4*, 439; *Chem. Abstr.* 1973, *78*, 11751 g); in cat digoxin (20 μg/kg every 15 min., i.v.) showed neuroexcitatory effects such as enhanced neural activity in pre- and post-ganglionic cardiac sympathetic nerves, phrenic and carotid sinus nerves; maximum enhancement was observed just prior to ventricular fibrillation (*J. Pharmacol. Exp. Ther.* 1976, *199*, 583); digoxin (0.8 mg, i.v.) in man immediately increased systemic vascular resistance; inotropic action followed 10-30 min after injection (*Int. J. Clin. Pharmacol. Biopharm.* 1977, *15*, 189; *Chem. Abstr.* 1977, *87*, 78562 a); external application of digitoxigenin (10^{-7}-10^{-4}M) inhibited Na efflux in barnacle muscle fibres but external application of digitoxigenin or ouabain after internal application of aglycone did not affect Na efflux (*J. Physiol.* 1977, *267*, 667; *Chem. Abstr.* 1977, *87*, 78263 d); normal human subjects treated with digoxin (0.5 mg/day for 10 days, orally) showed an increase in myocardial contractility (*Rev. Esp. Cardiol.* 1977, *30*, 53; *Chem. Abstr.* 1977, *87*, 78599 t); anuric and normal patients given 0.1 mg digoxin/day showed plasma digoxin values far below the lower limit of therapeutic range of plasma digoxin. Results showed that digoxin retention in anuric patients plays an insignificant role (*Klin. Wochenschr.* 1977, *55*, 254; *Chem. Abstr.* 1977, *87*, 48163 d).

Dose of ouabain necessary to produce ventricular tachycardia in rabbits of various age groups showed that sensitivity of rabbit to cardiotoxic action of digitalis increases with age (*J. Pharmacol. Exp. Ther.* 1976, *197*, 10).

D. purpurea L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 160).

Two new glucuronoxylosides of luteolin isolated from leaves but not identified (*C. R. Acad. Sci.* Ser. D 1969, *269*, 1675; *Chem. Abstr.* 1970, *72*, 63595 e); digitolutein, digitopurpone, phomarin and isochrysophanol found in leaves (*J. Chem. Soc.* C 1971, 2007); saponification of methyl esters of triglyceride fraction yielded C_{10},C_{14},C_{16} and C_{18} saturated acids, $C_{16:1}$ and $C_{18:1}$ monounsaturated, $C_{18:2}$ diunsaturated and $C_{18:3}$ triunsaturated acids (*J. Pharm. Pharmacol.* 1972, *24*, Suppl., 168); cycloeucalenol, obtusifoliol, 24-methylenelophenol, 24-ethylenelophenol, β-sitosterol, stigmasterol, isofucosterol, campesterol, cholesterol and 24-methylenecholesterol isolated from flowers and seeds (*J. Pharm. Pharmacol.* 1972, *24*, 227; *ibid.* 1973, *25*, 156); in addition, cycloartenol, 24-methylenecycloartenol, 24-methyllophenol and 24-ethyllophenol isolated from seeds (*J. Pharm. Pharmacol.* 1972, *24*, 227); glucose was major carbohydrate in leaves and stems whereas fructose predominated in inflorescence at various stages of plant growth (*Phytochemistry* 1973, *12*, 2331); a bisdesmosidic 22-hydroxyfurostanol glycoside - purpureagitoside - from leaves characterised (*Chem. Ber.* 1974, *107*, 2828); apigenin, dinatin, chrysoeriol and nepetin from leaves (*Planta Med.* 1977, *32*, 347).

NEW COMPOUNDS



Purpureagitoside
R = Glu(4→1)Glu[(2→1)Glu]Glu(3→1)Ara

BIOLOGICAL ACTIVITY

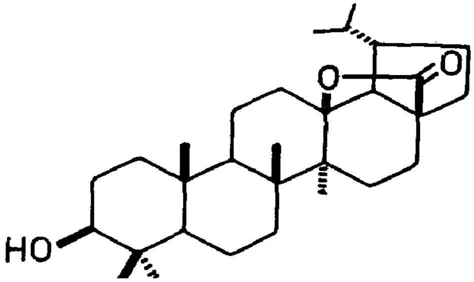
Digoxin at 0.01 or 0.04 mg/kg/day orally, produced satisfactory clinical response in neonates with heart failure; plasma digoxin concentration found to be 1.5 and 2.5 ng/ml respectively at these doses (*IRCS Libr. Compend.* 1974, *1*, 10.1.1; *Chem. Abstr.* 1975, *82*, 11350 h).

DILLENIA (Dilleniaceae)

D. indica L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 163).

New pentacyclic triterpene lactone - 3β-hydroxylupan-13β,28-olide-in addition to betulin aldehyde, betulin, lupeol, sitosterol, betulinic acid and myricetin isolated (*Phytochemistry* 1975, *14*, 1447); 3′,5′-dihydroxy-4′,3-dimethoxyflavone-7-O-β-D-glucopyranoside, 4,5,7,3′,4′-pentahydroxyflavone-3-O-β-D-glucopyranoside, 5,7-dihydroxy-4′-methoxyflavone-3-O-β-D-glucopyranoside and 1,8-dihydroxy-2-methylanthraquinone-3-O-β-D-glucopyranoside from stem bark (*Planta Med.* 1979, *35*, 188).

NEW COMPOUNDS



3β-Hydroxylupan-13β,28-olide

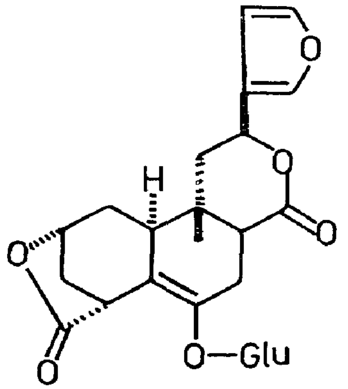
DIOSCOREA (Dioscoreaceae)

D. bulbifera L. forma *spontanea* Makino & Nemoto syn. *D. sativa* auct. (non L.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 163).

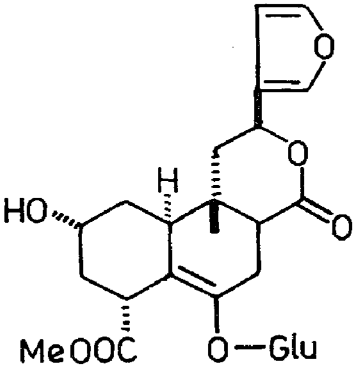
Isolation and structure determination of furanoid norditerpenes - diosbulbinosides D and F - from tubers (*Chem. Pharm. Bull.* 1978, *26*, 435); diosbulbins D,E,F,G and H isolated and their structures elucidated (*Ann. Chem.* 1978, 818); a new dihydrophenanthrene (2,4,6,7-

tetrahydroxy-9,10-dihydrophenanthrene, I) and a new phenanthrene (2,4,5,6-tetrahydroxyphenanthrene), in addition to diosbulbins B and D and D-sorbitol isolated from rhizomes (*Indian J. Chem.* 1978, *16*B, 643).

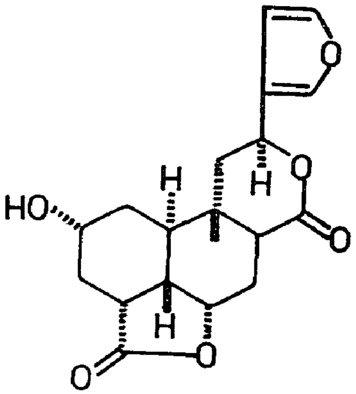
NEW COMPOUNDS



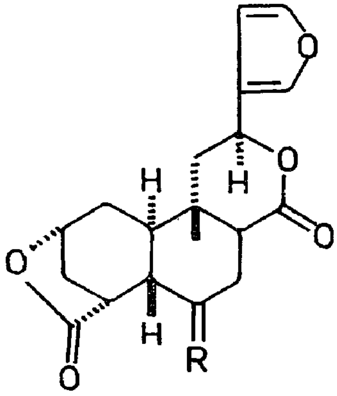
Diosbulbinoside D



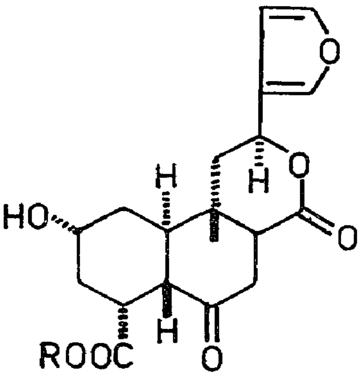
Diosbulbinoside F



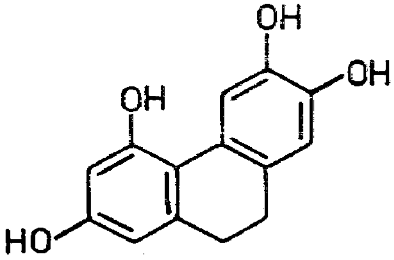
Diosbulbin G



Diosbulbin D
R = O
Diosbulbin E
R = α-OH,H



Diosbulbin F
R = Me
Diosbulbin H
R = Bu



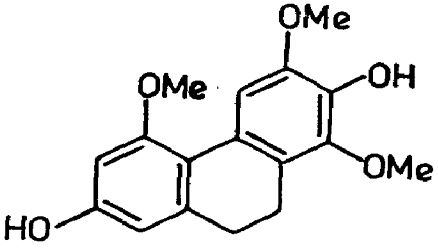
I

D. decipiens Hook.f.

Isolation and structure of a new dihydrophenanthrene derivative (I) from rhizomes (*Phytochemistry* 1978, *17*, 1067).

Distribution : Assam.

NEW COMPOUNDS

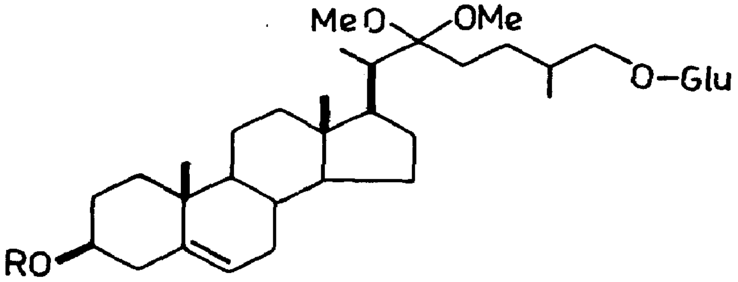


I

D. deltoidea Wall. ex Kunth (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 164).

Trioside and tetraoside (I) of furostanol type, diosgenin and their acetates isolated from rhizomes and their structures determined (*Izv. Akad. Nauk SSSR*, Ser. *Khim.* 1975, 90; *Chem. Abstr.* 1975, *82*, 156636 r).

NEW COMPOUNDS



I

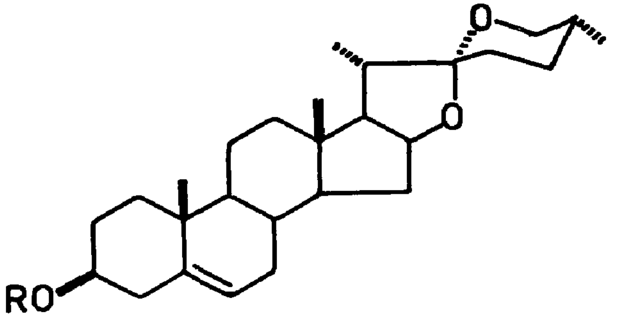
R = Glu[(2→1)Rha](4→1)Glu

D. floribunda Mart. & Gal.

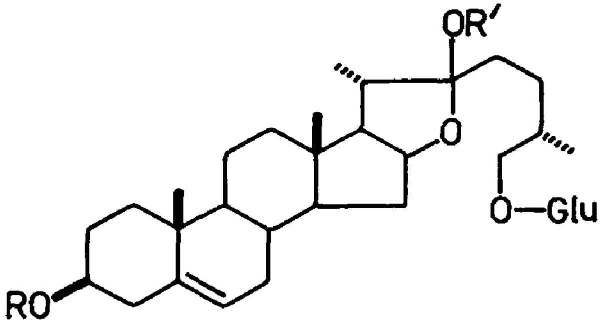
New steroidal saponins - floribundasaponin C (3-O-[α-L-rhamnopyranosyl(1→3)-α-L-rhamnopyranosyl(1→4)-β-D-glucopyranosyl]-(25R)spirost-5-ene-3β-ol), floribundasaponin-D(3-O-[α-L-rhamnopyranosyl(1→3)-α-L-rhamnopyranosyl(1→3)-α-L-rhanopyranosyl(1→3) α-L-rhamnopyranosyl(1→4)-β-D-glucopyranosyl]-(25R)spirost-5-ene-3β-ol), floribundasaponin E (3-O-[α-L-rhamnopyranosyl(1→3)-α-L-rhamnopyranosyl(1→3)-α-rhamnopyranosyl(1→3)-α-L-rhamnopyranosyl(1→4)-β-D-glucopyranosyl]-26-O-[β-D-glucopyranosyl]-(25R)22α-methoxyfurost-5-en-3β,26-diol) and floribundasaponin F (3-O-[α-L-rhamnopyranosyl(1→3-α-L-rhamnopyranosyl(1→3)-α-L-rhamnopyranosyl(1→3)-α-L– rhamnopyranosyl(1→4)-β-D-glucopyranosyl]-26-O-[β-D-glucopyranosyl]-(25R)furost-5-en-3β, 22α, 26-triol) - isolated from yams and characterised (*Indian J. Chem.* 1978, *16*B, 350); method for efficient acid hydrolysis of steroidal saponins from fenugreek seeds for maximal yield of diosgenin (*Lloydia* 1978, *41*, 247); detection of ten amino acids in free and eight in bound states along with quercetin and diosgenin in tubers which constitute a commercial source of diosgenin (2.7%) (*Indian Drugs* 1978, *15*, 51).

Distribution : Native of Mexico, introduced into India.

NEW COMPOUNDS



Floribundasaponin C
R = Glu(4→1)Rha(3→1)Rha
Floribundasaponin D
R = Glu(4→1)Rha(3→1)Rha(3→1)Rha(3→1)Rha

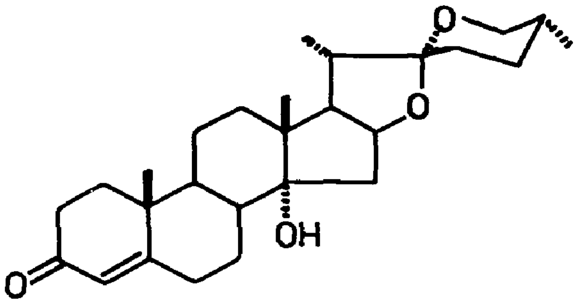


Floribundasaponin E
R = Glu(4→1)Rha(3→1)Rha(3→1)Rha(3→1)Rha, R′ = Me
Floribundasaponin F
R = Glu(4→1)Rha(3→1)Rha(3→1)Rha(3→1)Rha, R′ = H

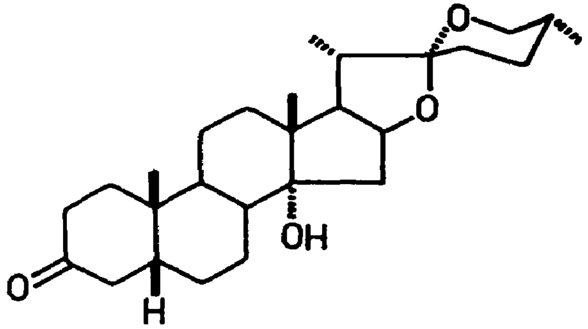
D. prazeri Prain & Burkill (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 164).

Isolation and structures of three new steroidal sapogenins - prazerigenins A,B, and C - from rhizomes (*J. Chem. Soc.* Perkin 1 1975, 1560); two new 9,10-dihydrophenanthrenes isolated from rhizomes characterised as 5,6-dihydroxy-1,3,4-trimethoxy-9,10-dihydrophenanthrene (I) and 5,6-dihydroxy-2,4-dimethoxy-9,10-dihydroxyphenanthrene (II) (*Indian J. Chem.* 1975, *13*, 1137); three new glycosides from rhizomes characterised as diosgenin-3-O-α-L-rhamnopyranosyl(1→6)-β-D-glucopyranoside (III), diosgenin-3-O-α-L-rhamnopyranosyl(1→6)-O-β-D-glucopyranosyl (1→6)-β-D-glucopyranoside (IV) and prazerigenin A-3-O-α-L-rhamnopyranosyl(1→6)-O-β-D-glucopyranosyl(1→6)-β-D-glucopyranoside (V) (*Indian J. Chem.* 1977, *15*B, 451).

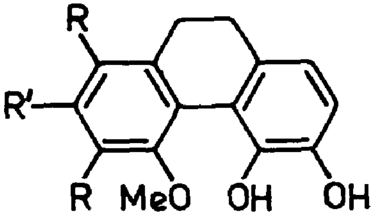
NEW COMPOUNDS



Prazerigenin B



Prazerigenin C

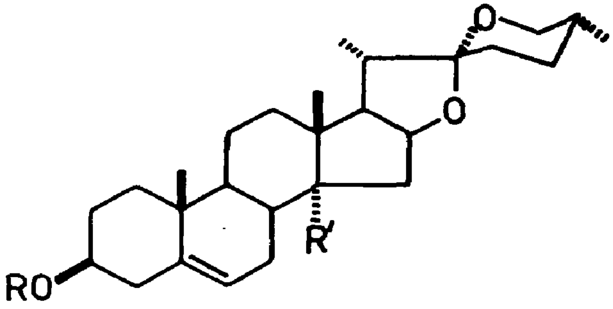


I

R = OMe, R′ = H

II

R = H, R′ = OMe



Prazerigenin A

R = H, R′ = OH

III

R = Glu(6→1)Rha, R′ = H

IV

R = Glu(6→1)Glu(6→1)Rha, R′ = H

V

R = Glu(6→1)Glu(6→1)Rha, R′ = OH

D. sativa L.; see *D. bulbifera* L. forma *spontanea* Makino Nemoto

DIOSPYROS (Ebenaceae)

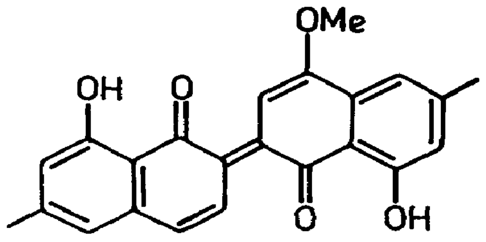
D. buxifolia (Blume) Hiern syn. *D. microphylla* Bedd.

Tam. - Chinnathuvarai; Kan. - Kunchiganamara; Mal. - Illaccuvicca, Kattuthovora.

β-Sitosterol, betulinic acid, lupeol and betulin isolated (*Phytochemistry* 1971, *10*, 2829); a blue pigment - diosindigo A - isolated from wood and its structure determined (*J. Chem. Soc.* Perkin 1 1974, 1128).

Distribution : South India, in evergreen forests of Western Ghats from north Kanara to Travancore upto 1100 m, Tamil Nadu and Mysore.

NEW COMPOUNDS

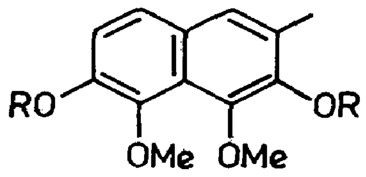


Diosindigo A

D. chloroxylon Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 165).

Two naphthol derivatives isolated and structures assigned as 2-methyl-3,6-dihydroxy-4,5-dimethoxy-naphthalene (I) and 2-methyl-3,4,5,6-tetramethoxynaphthalene (II) (*Indian J. Chem.* 1971, *9*, 767).

NEW COMPOUNDS



I
R = H
II
R = Me

D. cordifolia Roxb.; see *D. montana* Roxb. var. *cordifolia* (Roxb.) Hiern

D. embryopteris Pers.; see *D. malabarica* (Desr.) Kostel

D. exsculpta Buch.-Ham. syn. D. *tomentosa* Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 99).

Lupeol, betulin, betulinic acid and β-sitosterol isolated (*Phytochemistry* 1971, *10*, 2829).

D. ferrea (Willd.) Bakh. syn. *Maba buxifolia* Pers.

B. - Angaru; Tel. - Cinnavullinji, Pisinika; Tam. - Irumballi, Kuruvinci; Kan. - Karugana, Piccane; Oriya - Gourokholi, Pitonu, Goakuli, Guakuli.

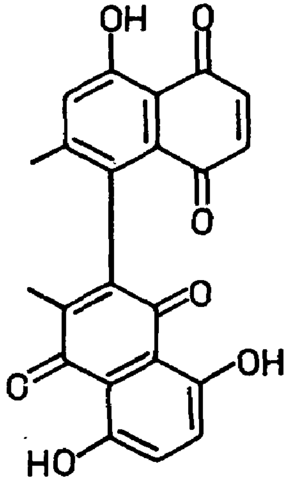
Taraxerol, betulinic acid and β-sitosterol isolated (*Phytochemistry* 1971, *10*, 2829).
Distribution : Dry evergreen forests. Scrub forests of Orissa and Deccan Peninsula.

D. kaki Linn.f. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 98).

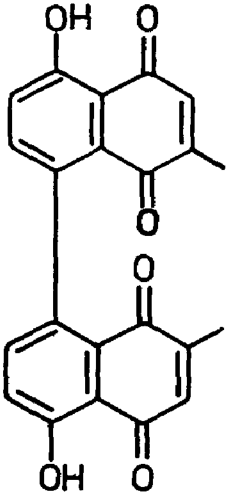
Betulic, oleanolic and ursolic acids from leaves (*Yakugaku Zasshi* 1971, *91*, 905; *Chem. Abstr.* 1971, *75*, 126550 w); four new naphthoquinone derivatives - 3-methoxy-7-methyljuglone,

neodiospyrin, maritinone and 8'-hydroxyisodiospyrin - from roots, in addition to known compounds (*Chem. Pharm. Bull.* 1971, *19*, 851); astragalin (kaempferol-3-β-D-glucopyranoside) from calyx (*Chem. Pharm. Bull.* 1978, *26*, 1936); kaki-tannin obtained from fruit, belonged to proanthocyanidin B group and yielded delphinidin and cyanidin on hydrolysis along with catechin-3-gallate, gallocatechin, gallocatechin-3-gallate and an unknown terminal residue (*Agric. Biol. Chem.* 1978, *42*, 1637; *Chem. Abstr.* 1979, *90*, 36291 t).

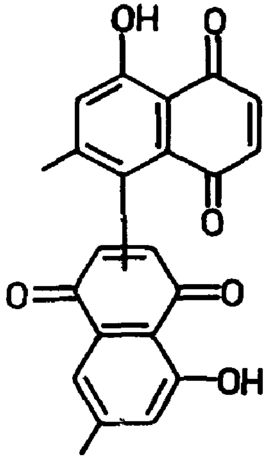
NEW COMPOUNDS



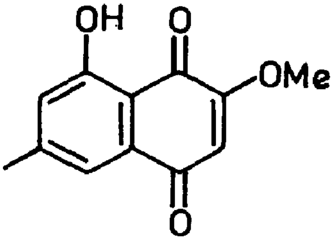
8-Hydroxyisodiospyrin



Maritinone



Neodiospyrin

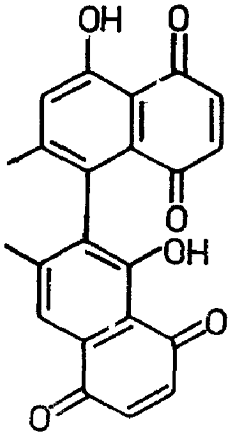


3-Methoxy-7-methyljuglone

D. lotus L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 98).

Taraxerol, betulinic acid and β-sitosterol isolated (*Phytochemistry* 1971, *10*, 2929); naphthoquinones - 7-methyljuglone, mamegakinone, isodiospyrin and bisisodiospyrin - isolated from roots (*Chem. Pharm. Bull.* 1971, *19*, 2308).

NEW COMPOUNDS

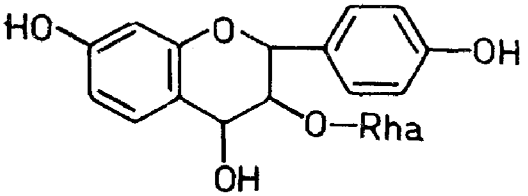


Isodiospyrin

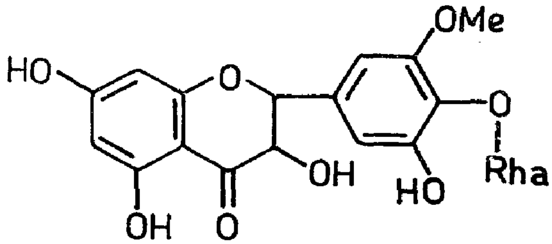
D. malabarica (Desr.) Kostel syn. *D. peregrina* Gurke, *D. embryopteris* Pers. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 165).

β-Sitosterol and its glucoside, betulin and a new monohydroxy triterpene ketone, mp. 196°, from fruit pulp (*Phytochemistry* 1971, *10*, 904); betulinic acid from seeds and fruit pulp; gallic acid from fruit pulp; hexacosane, hexacosanol, gallic acid and a triterpene ketone also isolated from fruit pulp (*Phytochemistry* 1971, *10*, 904; *ibid*. 1972, *11*, 1508); a new ieucoanthocyanin - leucopelargonidin-3-O-α-L-rhamnopyranoside (I) - from stem (*J. Indian Chem. Soc.* 1978, *55*, 1068); a new dihydroflavonol glycoside (II) isolated from roots and characterised (*Planta Med.* 1979, *35*, 373).

NEW COMPOUNDS



I

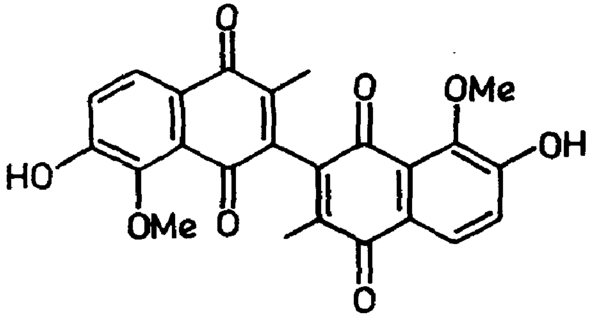


II

D. melanoxylon Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 165).

Hentriacontane, hentriacontanol and α-amyrin from leaves (*Labdev* 1973, *10*B, 163; *Chem. Abstr.* 1974, *80*, 12516 n); a new binaphthoquinone isolated from heartwood and characterised as 3,3′-dimer of 6-hydroxy-5-methoxy-2-methylnaphthoquinone (I) (*Indian J. Chem.* 1973, *11*, 507).

NEW COMPOUNDS



I

BIOLOGICAL ACTIVITY

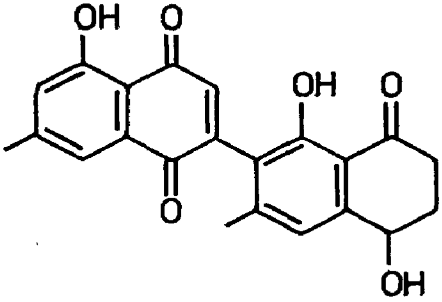
Blood sugar concentration, glycogen and ATP contents in muscles, heart and uterus increased on intragastric administration of ursolic acid (10 mg/kg, daily for 10 days) into rats (*Issled. Mekh. Vliyaniya Bal'neol. Faktorov Regul. Sist. Org.* 1976, 101; *Chem. Abstr.* 1978, *88*, 164310 u).

D. microphylla Bedd.; see *D. buxifolia* (Blume) Hiern

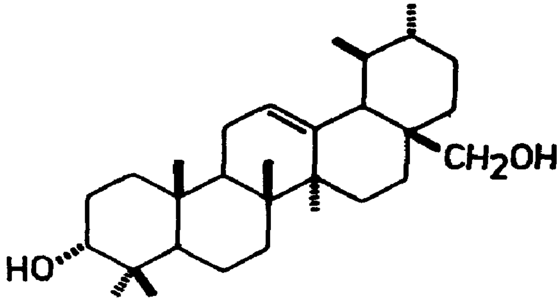
D. montana Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 166).

Fatty esters of α-amyrin, ursolic and oleanolic acids isolated from fruit pulp; betulinic acid from fruits and seeds (*Phytochemistry* 1972, *11*, 1508); betulin, epiuvaol and a new triterpene characterised as urs-12-en-3α,28-diol (I) isolated along with lupeol, sitosterol and stigmasterol from leaves (*Phytochemistry* 1972, *11*, 1180); diospyrin from wood, leaves and bark (*J. Chem. Soc.* Perkin 1 1976, 2125; *Curr. Sci.* 1978, *47*, 345); 7-methyljuglone, mamegakinone, biramentacenone, isodiospyrin, 8'-hydroxydiospyrin, 3,5'-O-cyclodiospyrin, 3'-chloro-2'-hydroxydiospyrin (artefact), chromenone ester (II) and chromenone acid (III), allobetulin and oxyallobetulin from bark and wood (*J. Chem. Soc.* Perkin 1 1976, 2155); seed contained oil (1.5%) which yielded mixed fatty acids (82.5) and unsaponifiable material (1.04%); palmitic acid (27.91), stearic acid (11.09), oleic acid (37.08) and linoleic acid (23.92%) from saponifiable fraction and lupeol, β-sitosterol and stigmasterol from unsaponified material (*Seifen, Oele, Fette, Wachse* 1977, *103*, 99; *Chem. Abstr.* 1977, *86*, 161111 c); β-sitosterol, lupeol and betulic acid from leaves and fruits (*Curr. Sci.* 1978, *47*, 345; *Pol. J. Chem.* 1979, *53*, 735; *Chem. Abstr.* 1979, *91*, 52759 c); tetrahydrodiospyrin isolated from bark and characterised (*Phytochemistry* 1979, *18*, 684).

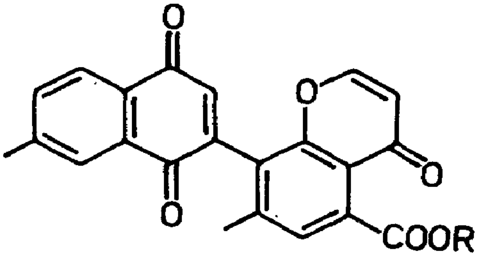
NEW COMPOUNDS



Tetrahydrodiospyrin



I



II
R = Et
III
R = H

D. montana Roxb. var. *cordifolia* (Roxb.) Hiern. syn. *D. montana* auct. (non Roxb.) p.p., *D. cordifolia* Roxb.

S. - Tumala; H. - Bistendu, Lohari; B. - Bangab; Bo. - Kundu; Mar. - Goindu; Tam. - Vakkanai; Tel. - Eddayagata.

Alcoholic extract of bark showed CNS depressant activity as indicated by ataxia, decreased locomotor activity and loss of righting reflex in mice and rats. It also had spasmolytic activity on rabbit and guinea pig ileum and produced hypotension in anaesthetised dogs (*J. Res. Indian Med.* 1971, *6*, 229); extract showed potent anti-inflammatory and antipyretic activities in rats and analgesic activity in mice (*J. Res. Indian Med.* 1973, *8*, 15).

Distribution : Throughout the greater part of India.

D. peregrina Gurke; see *D. malabarica* (Desr.) Kostel

D. quaesita Thw.

Eng. - Calamander, Ebony, Persimmon.

Sitosterol, lupeol, betulin, betulinic acid, taraxerol, taraxerone, ursolic acid, oleanolic acid, scopoletin, plumbagin, elliptinone, diospyrin and diosindigo A isolated (*Phytochemistry* 1978, *17*, 1007).

Distribution : Reported to be cultivated in India.

D. tomentosa Roxb.; see *D. exsculpta* Buch.-Ham.

D. variegata Kurz

Diosindigo A, lupeol and betulin isolated from wood (*J. Chem. Soc.* Perkin 1 1974, 1128).

Distribution : Assam.

DIPLAZIUM (Athyriaceae)

D. donianum (Mett.) Tard. syn. *D. fraxinifolium* sensu Bedd.

Phytoecdysones - makisterone A, makisterone D and an unidentified stereoisomer of makisterone B - isolated; two unidentified phytoecdysones present (*Steroids* 1976, *28*, 649).

Distribution : North-east India.

D. fraxinifolium Bedd.; see *D. donianum* (Mett.) Tard.

DIPLOCLISIA (Menispermaceae)

D. glaucescens (Bl.) Diels syn. *Cocculus macrocarpus* W. & A. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 99).

β-Sitosterol, γ-sitosterol, ginnol, an alkaloid (triboline) and a neutral substance, mp. 226°, isolated (*Indian J. Chem.* 1974, *12*, 226).

DIPTERACANTHUS (Acanthaceae)

D. prostratus (Poir.) Nees syn. *Ruellia prostrata* Poir. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 99).

Apigenin, luteolin and their 7-glucosides and apigenin-7-β-glucuronide isolated from buds and flowers (*J. Indian Chem. Soc.* 1972, *49*, 825).

DIPTEROCARPUS (Dipterocarpaceae)

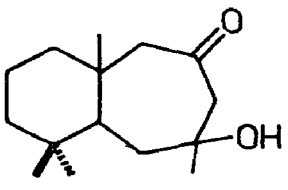
D. macrocarpus Vesque

Eng - Hollong Gurjun tree.

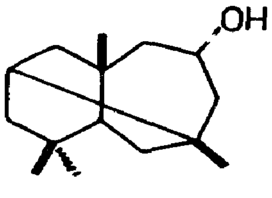
Two new sesquiterpenes - dipterolone and dipterol - along with asiatic acid, dipterocarpol, dammarenediol, p-coumaric acid and two unidentified hydroxy fatty acid esters isolated from heartwood (*Indian J. Chem.* 1974, *12*, 520).

Distribution : Assam and Andaman & Nicobar Islands.

NEW COMPOUNDS



Dipterolone



Dipterol

D. turbinatus Gaertn. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 100).

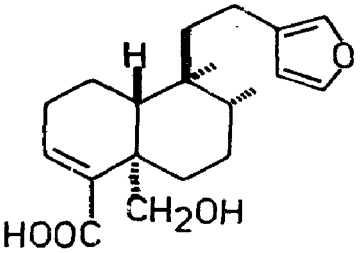
Dipteroc~~ool from wood (*J. Indian Chem. Soc.* 1973, *50*, 571).

DODONAEA (Sapindaceae)

D. viscosa (L.) Jacq. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 166).

Structure of hautriwaic acid confirmed (*Phytochemistry* 1971, *10*, 2813); kaempferol-3,7-dimethyl ether and kaempferol-3,4',7-trimethyl ether from flowers (*Rev. Latinoam. Quim.* 1978, *9*, 97; *Chem. Abstr.* 1978, *89*, 143352 q).

NEW COMPOUNDS



Hautriwaic acid

DOLICHANDRONE (Bignoniaceae)

D. falcata Seem. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 100).

Chrysin-7-rutinoside from leaves (*Phytochemistry* 1972, *11*, 438).

D. stipulata Benth. syn. *Markhamia stipulata* (Wall.) Seem. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 100).

Lapachol, dehydro-α-lapachone, dehydro-iso-α-lapachone, β-lapachone, tectol, paulownin, palmitone and β-sitosterol isolated from heartwood (*Planta Med.* 1978, *34*, 219).

DOLICHOS (Papiloniaceae)

D. falcatus Klein ex Willd.; see *D. trilobus* L.

D. lablab L.; see *Lablab purpureus* (L.) Sweet

D. trilobus L. syn. *D. falcatus* Klein ex Willd. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 100).

γ-Glutamylphenylalanine obtained from seeds (*Phytochemistry* 1973, *12*, 473).

DOMBEYA (Sterculiaceae)

D. calantha Schum.

Quercetin-3-glucoside and diosmetin-7-β-D-glucuronide isolated from flowers (*Curr. Sci.* 1973, *42*, 438).

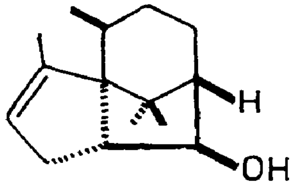
Distribution : Indigenous to Central Africa, grown in gardens in India.

DORONICUM (Asteraceae)

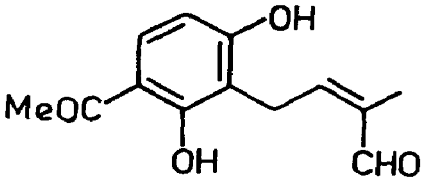
D. pardalianches L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 101).

A new sesquiterpene alcohol - pardalianchol - and 2,4-dihydroxy-3[4-oxo-3-methyl-but-2E-en-1-yl]-acetophenone (I) isolated and characterised (*Phytochemistry* 1979, *18*, 668).

NEW COMPOUNDS



Pardalianchol



I

DRACOCEPHALUM (Lamiaceae)

D. moldavicum L. (moldavica) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 167).

Fourteen components identified in essential oil, of which citral a and citral b were major components; essential oil (0.2-0.625 ml/%dry material) obtained from aerial parts (*Farmacia* 1978, *26*, 93; *Chem. Abstr.* 1979, *90*, 43662 t).

D. nutans L.

Cosmosiin (apigenin-7-β-D-glucopyranoside) and cinaroside (luteolin-7-β-D-glucopyranoside) identified by PC (*Khim. Prir. Soedin.* 1975, *11*, 255; *Chem. Abstr.* 1975, *83*, 111116 a); luteolin-5-O-β-L-galactoside isolated (*Khim. Prir. Soedin.* 1977, *13*, 577; *Chem. Abstr.* 1977, *87*, 197264 q); leaves contained apigenin (0.15) and luteolin (0.27), whereas flowers and stems contained apigenin (0.11, 0.097) and luteolin (0.12, 0.13%) respectively (*Khim. Prir. Soedin.* 1979, *15*, 230; *Chem. Abstr.* 1979, *91*, 171683 h).

Distribution : Kashmir, alt. 2700-3000 m.

DREGEA (Asclepiadaceae)

D. volubilis Benth. ex Hook.f.; see *Wattakaka volubilis* (L.) Stapf

DRYNARIA (Polypodiaceae)

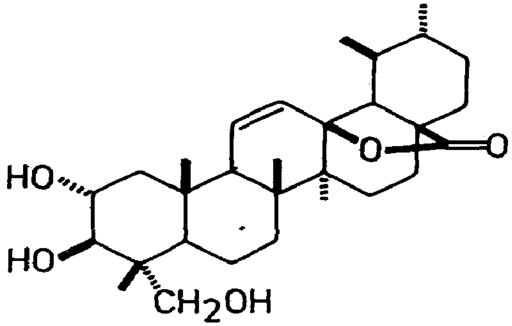
D. coronans J. Sm.; see *Pseudodrynaria coronans* (Wall. ex Mett.) Ching

DRYOBALANOPS (Dipterocarpaceae)

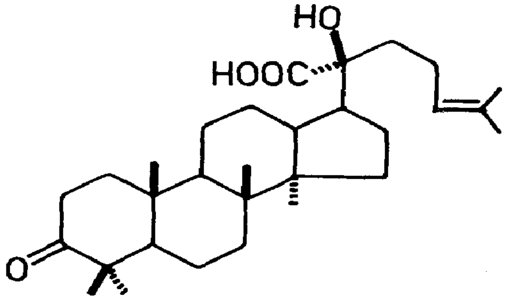
D. aromatica Gaertn.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 168).

Oleanolic acid acetate and hedragonic acid isolated from resin along with dryobalanonoloic acid which was characterised as 20(S)-20-hydroxydammar-24-en-3-one-21-oic acid; methyl 11-oxoasiatate and dryobalanolide also isolated and latter characterised as 2α,3β,23-trihydroxyursa-11-en-13β,28-olide (*Phytochemistry* 1972, *11*, 1771).

NEW COMPOUNDS



Dryobalanonoloic acid



Dryobalanolide

DRYOPTERIS (Dryopteridaceae)

D. chrysocoma (Christ) C. Chr. var. *chrysocoma* syn. *Lastrea filix-mas* Presl. var. *elongata* Bedd. p.p.

Phloroglucinol derivatives - albaspindin, filixic acid and flavaspidic acid - from rhizomes (*Phytochemistry* 1976, *15*, 343).

Distribution : Himalayas, Nepal, Bhutan and south India.

D. marginata (Wall. ex Christ) Christ syn. *Lastrea filix-mas* Presl var. *elongata* Bedd. p.p.

Plant contained chiefly margaspidin and smaller amounts of phloraspidinol, phloraspin, para-aspidin, trispara-aspidin, filixic acid, aspindol and flavaspidic acid (*Planta Med.* 1978, *33*, 177).

Distribution : Himalayas, Nepal and south India.

D. punctata C. Chr.; see *Hypolepis punctata* (Thunb.) Mett. ex Kuhn

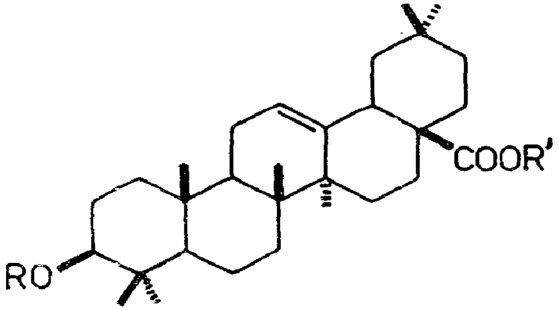
DRYPETES (Euphorbiaceae)

D. roxburghii (Wall.) Hurus syn. *Putranjiva roxburghii* Wall. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 169).

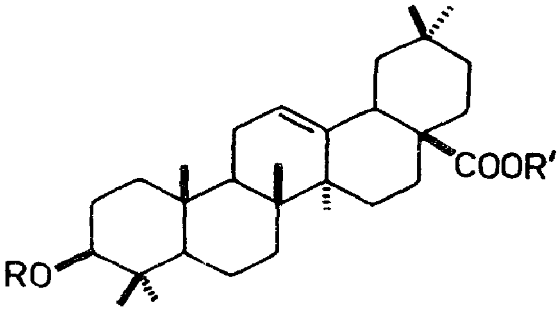
A new seco acid - putric acid - from stem bark characterised as 2-hydroxy-3,4-secofriedelan-3-oic acid (*Indian J. Chem.* 1970, *8*, 401); a new biflavonoid - putraflavone - from leaves characterised as 7,4''-dimethylamentoflavone (*Phytochemistry* 1971, *10*, 2787); amentoflavone, 4'''-O-methylamentoflavone and 4''',7-di-O-methylamentoflavone isolated from leaves (*Phytochemistry* 1973, *12*, 1501); structure of putranjivanonol elucidated (*Planta Med.*

1971, *19*, 352); structures of putrone and putrol revised (*Indian J. Chem.* 1973, *11*, 525); putranosides A, B, C and D isolated as methyl esters from seed coat and their structures elucidated; putranoside D established as β-D-glucopyranosyl(1→28) ester of [α-L-rhamnopyranosyl(1→3)]-β-D-xylopyranosyl(1→4)-β-D-glucuronopyranosyl (1→3)oleanolic acid; in putranoside C xylose was absent and in putranosides A and B glucosyl unit attached to 28-COOH in putranosides C and D respectively was absent (*Indian J. Chem.* 1973, *11*, 830; *ibid.* 1974, *12*, 447; *J. Res. Indian Med.* 1974, *9*, 70; *Chem. Abstr.* 1976, *85*, 17103 p); leaves yielded putranjiva saponin A (α-L-rhamnopyranosyl(1→2)-β-D-glucopyranosyl(1→3)-β-D-glucuronopyranosyl(1→3)-oleanolic acid, saponin B (α-L-rhamnopyranosyl(1→2)-β-D-glucopyranosyl(1→3)[β-D-xylopyranosyl(1-4)]-β-D-glucuronopyranosyl(1→3)-oleanolicacid saponins C and D were β-D-glucopyranosyl(1→28) esters of saponins A and B respectively (*Indian J. Chem.* 1971, *9*, 189; *ibid.* 1975, *13*, 447).

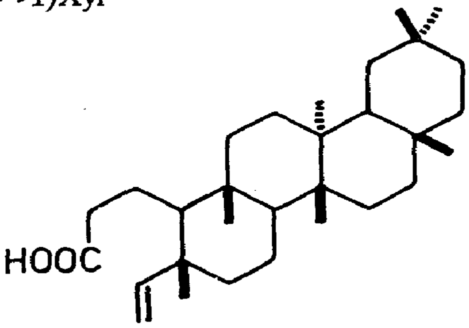
NEW COMPOUNDS



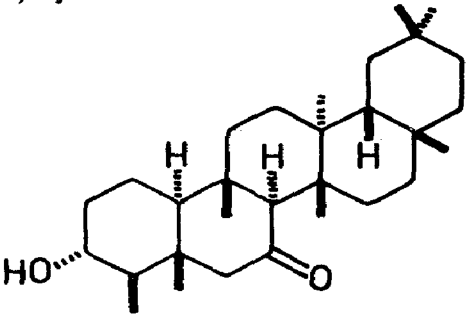
Putranoside A
R = Gluc. acid(3→1)Rha, R′ = H
Putranoside B
R = Gluc. acid[X](3→1)Rha, R′ = H
Putranoside C
R = Gluc. acid(3→1)Rha, R′ = Glu
Putranoside D
R = Gluc.acid[X](3→1)Rha
R′ = Glu
X = (4→1)Xyl



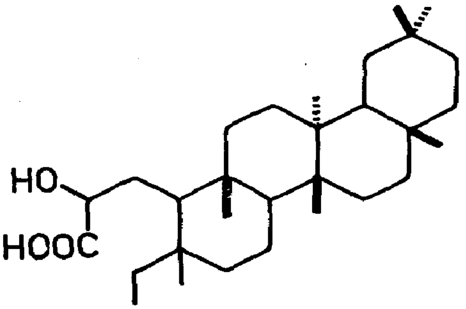
Saponin A
R = Gluc.acid(3→1)Glu(2→1)Rha, R′ = H
Saponin B
R = Gluc.acid[X](3→1)Glu(2→1)Rha, R′ = H
Saponin C
R = Gluc. acid(3→1)Glu(2→1)Rha, R′ = Glu
Saponin D
R = Gluc.acid[X](3→1)Glu(2→1)Rha
R′ = Glu
X = (4→1)Xyl



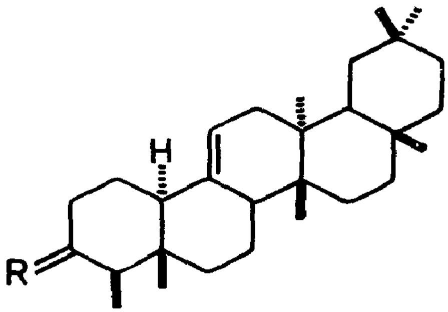
Putranjivic acid



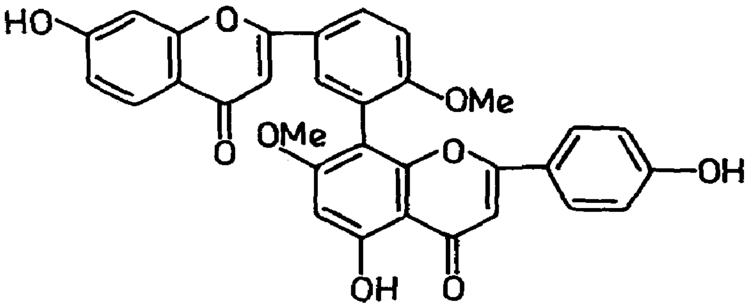
Putranjivanonol



Putric acid



Putrone
R = O
Putrol
R = α-OH, β-H



Putraflavone

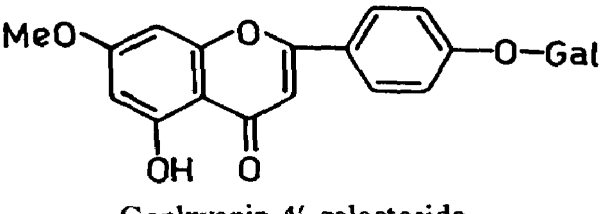
DUABANGA (Lythraceae)

D. grandiflora (Roxb. ex DC.) Walp. syn. *D. sonneratioides* Buch.-Ham.

β-Sitosterol isolated (*Phytochemistry* 1971, *10*, 2247); hentriacontanone, lignoceryl ferulate, betulinic acid and β-sitosterol-β-D-glucoside from stem bark (*Phytochemistry* 1972, *11*, 2621); a new flavone galactoside - 5-hydroxy-7-methoxylflavone-4 -O-galactoside (genkwanin-4′-galactoside) - along with ellagic acid, ellagic acid tetramethyl ether and epioleanolic acid isolated (*Phytochemistry* 1974, *13*, 527).

Distribution : Nepal eastwards in Sikkim, Bhutan, Meghalaya and Assam, ascending to 1000 m in hills.

NEW COMPOUNDS



Genkwanin-4′-galactoside

D. sonneratioides Buch.-Ham.; see *D. grandiflora* (Roxb. ex DC.) Walp.

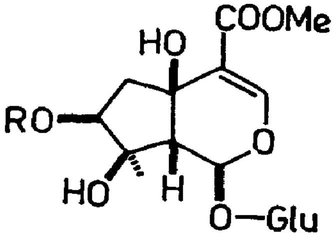
DURANTA (Verbenaceae)

D. plumieri Jacq.; see *D. repens* L.

D. repens L. syn. *D. plumieri* Jacq. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 170).

Scutellarein and pectolinarigenin, mp. 210° (4′,6-dimethylscutellarein) isolated from leaves (*Phytochemistry* 1972, *11*, 3095); lamiide and three new iridoids - durantosides I,II and III - isolated and characterised (*Z. Naturforsch.* 1974, *29*C, 111; *Chem. Abstr.* 1974, *81*, 10946 z); durantoside IV tetraacetate,durantoside I tetraacetate, pentaacetate and durantoside II tetraacetate also isolated; structure of durantoside IV tetraacetate elucidated (*Experientia* 1976, *32*, 968); oleanolic acid, methyl p-methoxycinnamate, methyl p-hydroxycinnamate and durantoside IV isolated from fruits (*Indian J. Chem.* 1978, *16*B, 844).

NEW COMPOUNDS



Durantoside I
R = Cinnamoyl
Durantoside II
R = Cinnamoyl(4-OMe)
Durantoside III
R = Cinnamoyl(3,4-di-OMe)
Durantoside IV
R = p-Coumaroyl
Lamiide
R = H

DYSOPHYLLA (Lamiaceae)

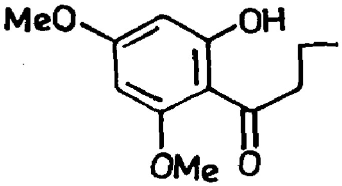
D. stellata Benth.; see *D. tomentosa* Dalz.

D. tomentosa Dalz. syn. *D. stellata* sensu Benth. (excl. basionym)

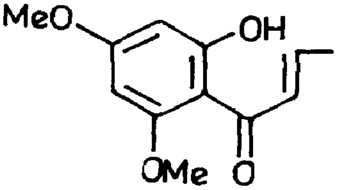
Two phenolic ketones - 2′-hydroxy-4′6′-dimethoxybutyrophenone (I) and 1-(2-hydroxy-(4,6)-dimethoxyphenyl)but-2-en-1-one (II) - and stellatin (5-hydroxy-6,7-dimethoxy-2-methylchromone) isolated and characterised (*J. Chem. Soc.* Perkin 1 1977, 433).

Distribution : Central India and Western Ghats.

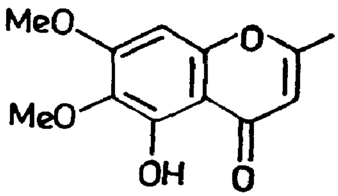
NEW COMPOUNDS



I



II



Stellatin

DYXOXYLUM (Meliaceae)

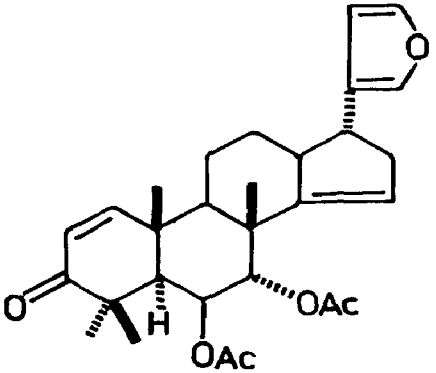
D. binectariferum Hook.f.

B. - Lassuni; Tam. - Agunivagil, Cembil; Kan. - Agilu, Kadugandha; Assam. - Bandardima.

A new tetranortriterpene - dysobinin - isolated from fruits and characterised (*Phytochemistry* 1976, *15*, 2001).

Distribution : Sikkim, Assam, West Bengal, Western Ghats and Andaman Islands.

NEW COMPOUNDS



Dysobinin

BIOLOGICAL ACTIVITY

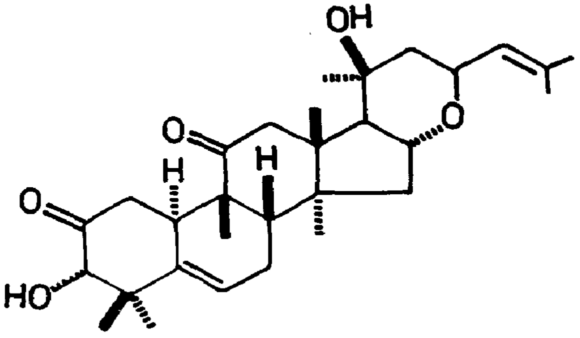
Dysobinin showed significant CNS-depressant action and mild anti- inflammatory activity (*Phytochemistry* 1976, *15*, 2001).

ECBALLIUM (Cucurbitaceae)

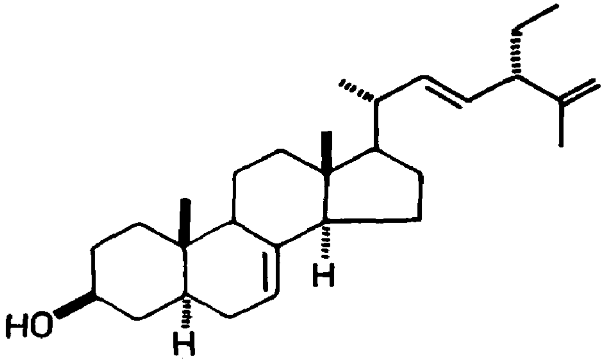
E. elaterium A. Rich. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Me otra, PID, New Delhi, 1990, p. 170).

25,26-Dihydro and 22,23,25,26-tetrahydroelasterol found in plant (*An. Quim.* 1969, *65*, 1139; *Chem. Abstr.* 1970, *73*, 73798 h; *Phytochemistry* 1976, *15*, 1533); cucurbitacins B, L and R, anhydro-22-deoxo-3-epiisocucurbitacin D, hexanorcucurbitacin I and 16-deoxy-16-dehydro-hexanorcucurbitacin O isolated from fruits (*J. Chem. Soc.* Perkin 1 1974, 2552); structure of elasterol revised to (24S)24-ethyl-5α-cholesta-7,22,25-trien- 3β-ol (*Phytochemistry* 1976, *15*, 1533; *ibid.* 1979, *18*, 1543).

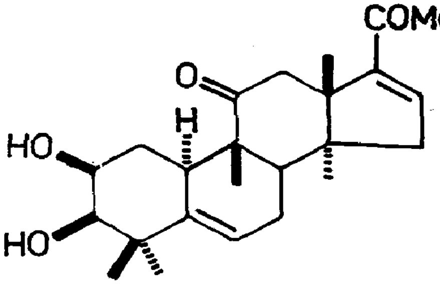
NEW COMPOUNDS



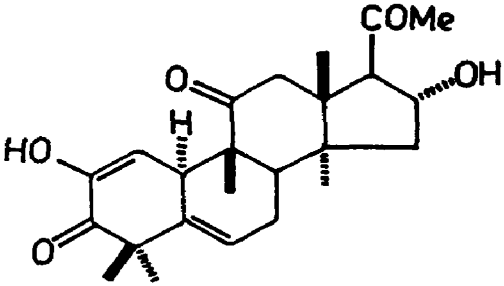
Anhydro-22-deoxo-3-epiisocucurbitacin D



Elasterol



16-Deoxy-16-dehydro-hexanorcucurbitacin O



Hexanorcucurbitacin I

ECBOLIUM (Acanthaceae)

E. linneanum Kurz; see *E. viride* (Forsk.) Alston

E. viride (Forsk.) Alston syn. *E. linneanum* Kurz. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 103).

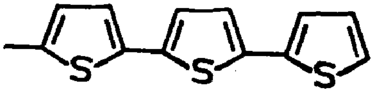
Orientin, vitexin, isoorientin and isovitexin isolated from leaves, flowers and roots (*Phytochemistry* 1975, *14*, 1644).

ECLIPTA (Asteraceae)

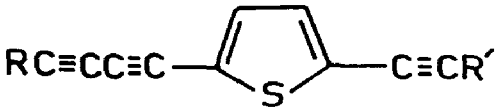
E. alba (L.) Hassk. syn. *E. erecta* L. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 104).

Sixteen new biogenetically closely related polyacetylenic thiophenes (I-XVI) isolated (*Chem. Ber.* 1970, *103*, 834); desmethylwedelolactone-7-O-glucoside isolated (*Indian J. Chem.* 1972, *10*, 810).

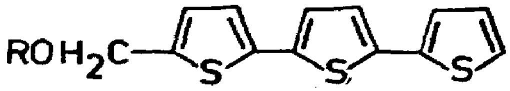
NEW COMPOUNDS



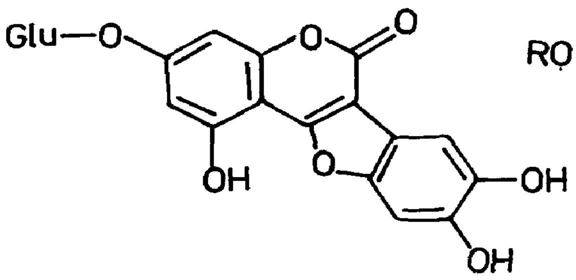
XVI



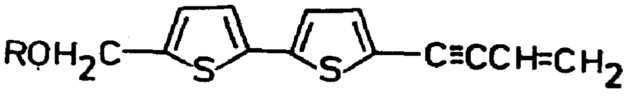
I
R = H, R′ = CH=CH_2
II
R = H, R′ = CH(OH)CH_2Cl
III
R = Me, R′ = CH(OAc)CH_2Cl
IV
R = Me, R′ = CH(OH)CH_2Cl
V
R = Me, R′ = CH(OH)CH_2OAc



VI
R = Ac
VII
R = Dimethylacryloyl
VIII
R = Isobutyryl
IX
R = Angeloyl
X
R = Tigloyl



Desmethylwedelolactone-7-glucoside



XI
R = Ac
XII
R = Dimethylacryloyl
XIII
R = Isobutyryl
XIV
R = Angeloyl
XV
R = Tigloyl

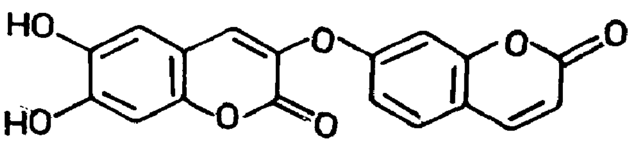
E. erecta L.; see ***E. alba*** (L.) Hassk.

EDGEWORTHIA (Thymelaeaceae)

E. gardneri (Wall.) Meissn. syn. *E. tomentosa* Nakai (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 104).

A new biscoumarin - edgeworthin - isolated from stem bark along with daphnoretin (*Phytochemistry* 1974, *13*, 1929).

NEW COMPOUNDS



Edgeworthin

E. tomentosa Nakai; see *E. gardneri* (Wall.) Meissn.

ELAEAGNUS (Elaeagnaceae)

E. angustifolia L. syn. *E. hortensis* M. Bieb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 171).

Harman and tetrahydroharman isolated from bark, stems and roots (*Khim. Prir. Soedin.* 1970, *6*, 493; *Chem. Abstr.* 1971, *74*, 1058 q); caffeic, chlorogenic and neochlorogenic acids isolated from leaves; (+)catechin and (-)epicatechin isolated from bark (*Khim. Prir. Soedin.* 1970, *6*, 765; *Chem. Abstr.* 1971, *74*, 95420 b); kaempferol-7-p-coumaroyl-3-D-glucoside, isorhamnetin-3-D-gluco-D-galactoside, isorhamnetin-3-D-gluco-D-feruloylgalactoside and isorhamnetin-3-rhamno-glucorhamnoside isolated from leaves (*Pol. J. Pharmacol. Pharm.* 1973, *25*, 599; *Chem. Abstr.* 1974, *80*, 68408 w).

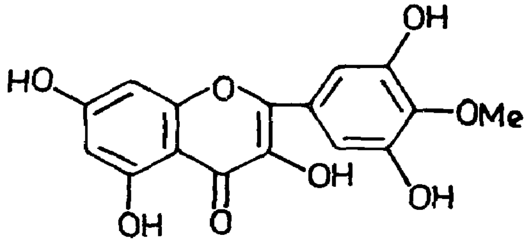
E. hortensis M. Bieb.; see *E. angustifolia* L.

ELAEOCARPUS (Elaeocarpaceae)

E. floribundus Blume (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 105).

Mearnsetin isolated from leaves along with myricetin and myricitrin (*Indian J. Chem.* 1977, *15*B, 197).

NEW COMPOUNDS



Mearnsetin

E. ganitrus Roxb. ex G. Don; see *E. sphaericus* (Gaertn.) K. Schum.

E. lanceaefolius Roxb.

Nep.- Batrachi, Badras; Lepcha - Shepkyew; Assam - Saklang, Dieng-soh-khyllam.

4'-O-Methylmyricetin, myricetin and its 3-O-rhamnoside isolated (*Phytochemistry* 1976, *15*, 1997).

Distribution : Sikkim, Bhutan and Meghalaya, alt. 1200-1800 m.

E. sphaericus (Gaertn.) K. Schum. syn. *E. ganitrus* Roxb. ex G. Don (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 105).

Absolute configurations assigned to seven isomeric alkaloids - (-)isoelaeocarpiline, (+)elaeocarpiline and alkaloids I-V - isolated from leaves (*Chem. Commun.* 1970, 804; *Aust. J. Chem.* 1971, *24*, 1679); isolation of elaeocarpidine, (±)elaeocarpine and (±)isoelaeocar-

pine (*Aust. J. Chem.* 1971, *24*, 1679; *J. Indian Chem. Soc.* 1976, *53*, 531; *Planta Med.* 1977, *32*, 197).

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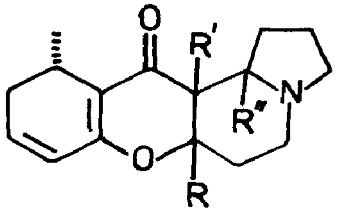
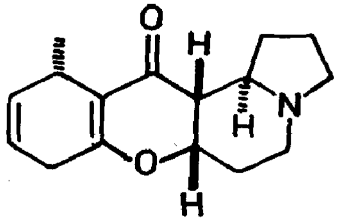


(-)Isoelaeocarpiline
R, R′ = αH, R″ = βH
(+) Elaeocarpiline
R, R″ = αH, R′ = βH
Alkaloid I
R, R′ = βH, R″ = αH
Alkaloid II
R,R″ = βH, R′ = αH
Alkaloid III
R′,R″ = αH, R = βH
Alkaloid IV
R′, R″ = βH, R = αH



Alkaloid V

ELAEODENDRON (Celastraceae)

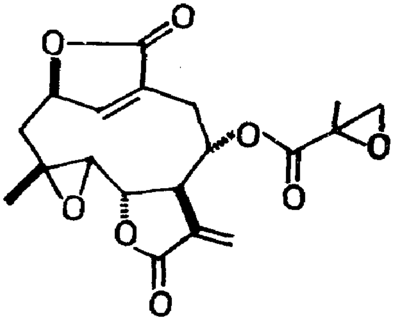
E. glaucum (Rottb.) Pers.; see *Cassine glauca* (Rottb.) Kuntze

ELEPHANTOPUS (Asteraceae)

E. scaber L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 172).

A new sesquiterpene dilactone - isodeoxyelephantopin - isolated (*Indian J. Chem.* 1972, *10*, 272).

NEW COMPOUNDS



Isodeoxyelephantopin

ELETTARIA (Zingiberaceae)

E. cardamomum (L.) Maton (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 172).

α-Pinene (1.2), β-pinene and sabinene (2.7), myrcene (1.4), D-limonene and 1,8-cineole (43.3), methylheptenone (0.03), linalool (5.1), linalool acetate (2.6), 4-terpineol (2.7), α-terpineol (2.8) and α-terpinyl acetate (32.9%) estimated in fruit essential oil by GC (*Cienc. Tecnol.* 1977, *1*, 5; *Chem. Abstr.* 1978, *88*, 27674 b).

ELEUSINE (Poaceae)

E. coracana (L.) Gaertn. ssp. *coracana* (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 106).

Orientin, isoorientin, vitexin, isovitexin, saponarin, violanthin,lucenin-1 and tricin found in leaves (*Biochem. Syst. Ecol.* 1978, *6*, 247; *Chem. Abstr.* 1979, *90*, 19088 q).

E. indica (L.) Gaertn. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 106).

Orientin, isoorientin, vitexin, isovitexin, saponarin, violanthin, lucenin-1 and tricin found in leaves (*Biochem. Syst. Ecol.* 1978, *6*, 247; *Chem. Abstr.* 1979, *90*, 19088 q).

ELEUTHEROCOCCUS (Araliaceae)

E. trifoliatus (L.) Hu syn. *Acanthopanax aculeatum* (Ait.) Seem., *A. trifoliatus* (L.) Merr.

Detection of n-pentadecanoic, palmitic, margaric, stearic and arachidic acids, stigmasterol and sitosterol by GLC (*Phytochemistry* 1973, *12*, 467).

Distribution : Nepal and Assam, ascending to 1400 m.

ELSHOLTZIA (Lamiaceae)

E. fruticosa (D. Don) Rehder syn. *E. polystachya* Benth.

P. - Rangchari, Garudar, Duss, Pothi, Jaunsar-potha; Kumaon - Bhangria; Assam - Jatonuningrit.

Caryophyllene epoxide isolated from oil (*Curr. Sci.* 1970, *39*, 182).

Distribution : Himalayas from Kashmir to Sikkim and Khasi Hills, alt. 1200-2700 m.

E. polystachya Benth.; see *E. fruticosa* (D. Don) Rehder

EMBELIA (Myrsinaceae)

E. ribes Burm.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 172).

Extract of berries showed antifertility activity in rats and also anti-oestrogenic activity (*J. Res. Indian Med.* 1971, *6*, 107); alcoholic extract of plant significantly increased glycogen, protein and nonprotein nitrogen contents in uterus of normal and ovariectomised rats. It also showed encouraging antifertility activity (*Indian J. Pharmacol.* 1979, *11*, 127).

E. robusta Clarke; see *E. tsjerium-cottam* A. DC.

E. tesjerium-cottam A. DC. syn. *E. robusta* Clarke (non Roxb.) (*Compendium Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 172).

Embelin isolated from stem (*Indian J. Chem.* 1977, *15*B, 291).

EMBLICA (Euphorbiaceae)

E. officinalis Gaertn. syn. *Phyllanthus emblica* L. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 106).

Seed fat contained linoleic acid (64.8%) and closely resembled linseed oil (*J. Oil Technol. Assoc.* India 1973, *5*, 8; *Chem. Abstr.* 1973, *78*, 156602 a); ellagic acid and lupeol from roots (*Indian J. Chem.* 1977, *15*B, 291).

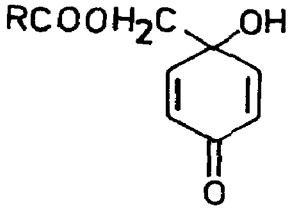
EMILIA (Asteraceae)

E. flammea Cass.; see *E. javanica* (Burm.f.) C. B. Robinson

E. javanica (Burm.f.) C.B. Robinson syn. *E. sagittata* DC., *E. flammea* Cass. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 107).

A new alkaloid - emiline, mp. 104° - isolated and its structure proposed (*Herba Pol.* 1971, *17*, 226; *Chem. Abstr.* 1972, *77*, 19848 u); two keto esters (I and II) and three polyacetylenic compounds (III,IV,V) isolated from aerial parts and characterised (*Phytochemistry* 1978, *17*, 557).

NEW COMPOUNDS



$$MeCH{=}CH(C{\equiv}C)_2CH{=}CHCH(OH)(CH_2)_2OR$$

I
R = Me
II
R = Et

III
R = Senecioyl
IV
R = 3-Methylpent-2E-enoyl

$$MeCH_2CH(OH)(C{\equiv}C)_2CH{=}CHCH(OH)(CH_2)_2OH$$

V

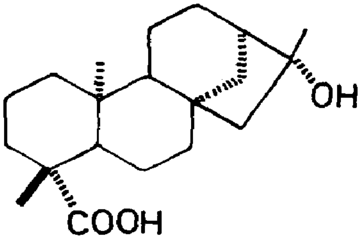
E. sagittata DC.; see *E. javanica* (Burm.f.) C. B. Robinson

ENHYDRA (Asteraceae)

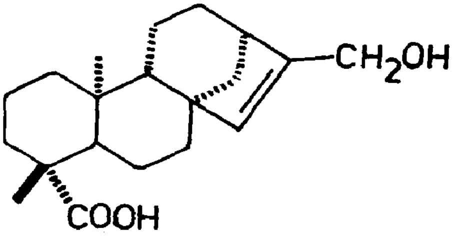
E. fluctuans Lour. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 173).

Isolation of (-)16α-hydroxykauran-19-oic acid (I), mp. 276°, and its characterisation (*Indian J. Chem.* 1970, *8*, 375, 569); isolation of stigmasta-5,22,25-trien-3β-ol from whole plant (*Tetrahedron Lett.* 1971, 365); a diterpene acid - 17-hydroxy-(-)kaur-15-en-19-oic acid (II) - isolated and characterised (*Indian J. Chem.* 1971, *9*, 1166); revised structure of enhydrin (*Curr. Sci.* 1971, *40*, 267; *Indian J. Chem.* 1972, *10*, 249; *Tetrahedron Lett.* 1972, *28*, 2285); isolation and structure of fluctuanin and fluctuadin (*Tetrahedron* 1972, *28*, 2285); isolation of 17-hydroxy-(-)kaur-15-en-19-oic acid as methyl ester along with 15α-isovaleroyloxy and 15α-angeloyloxy-(-)kaur-16-en-18-oic acids (III,IV) and determination of their structures (*J. Indian Chem. Soc.* 1974, *51*, 409); two new sterols - (24S)24-ethylcholesta-5,22,25-trien-3β-yl stearate (V), (24S)24-ethylcholesta-4,22,25-trien-3-one (VI) - along with stigmasta-4,22-dien-3-one isolated and characterised (*J. Indian Chem. Soc.* 1974, *51*, 419).

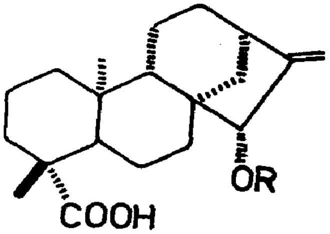
NEW COMPOUNDS



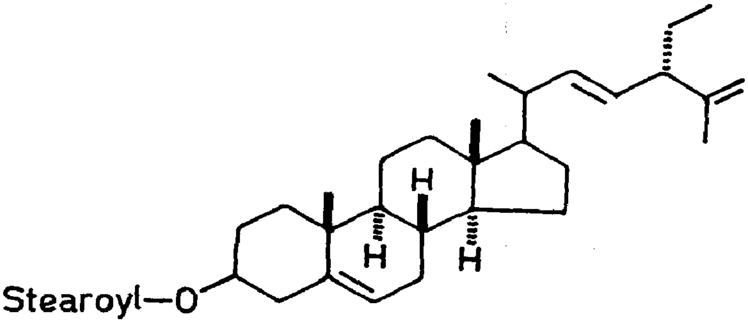
I



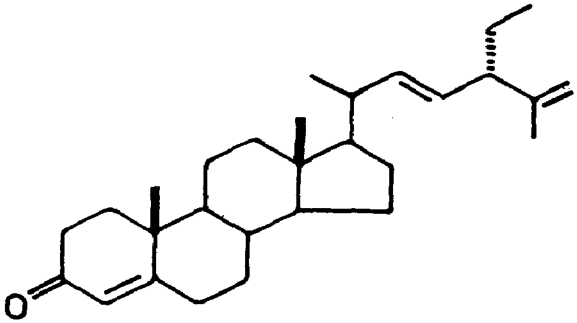
II



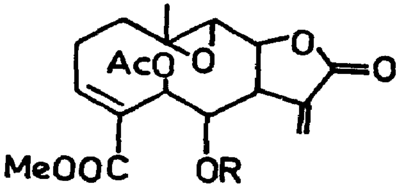
III
R = Isovaleryl
IV
R = Angeloyl



V



VI



Fluctuanin
R = Methacryloyl
Fluctuadin
R = Angeloyl

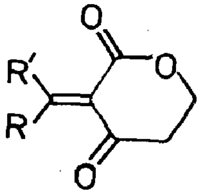
ENICOSTEMMA (Gentianaceae)

E. hyssopifolium (Willd.) Verd. syn. *E. littorale* Blume (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 173).

Alkaloidal fraction showed marked cardiac depression and weak antimalarial acitvity (*Planta Med.* 1972, *22*, 42); aqueous extract showed little effect on blood sugar level of normal rabbits but produced a significant reduction in diabetic rabbits (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 63).

Gentiocrucine shown to be mixture of three compounds (I, II and III) (*Tetrahedron Lett.* 1974, 403); a monoterpene alkaloid - enicoflavine - shown to be an equal mixture of cis and trans isomers (*Chem. Ind.* 1975, 127).

NEW COMPOUNDS

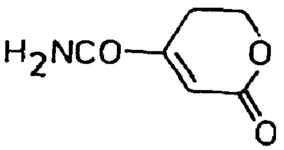


I

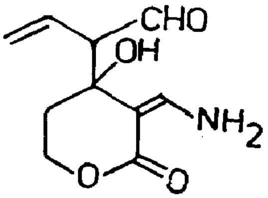
R = H, R′ = NH_2

II

R = NH_2, R′ = H



III



Enicoflavine

E. littorale Blume; see *E. hyssopifolium* (Willd.) Verd.

ENTADA (Mimosaceae)

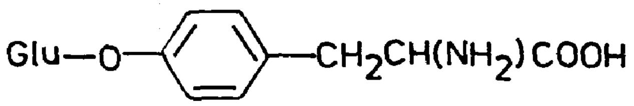
E. phaseoloides Merr.; see *E. pursaetha* DC. ssp. *pursaetha*

E. pursaetha DC. ssp. *pursaetha* syn. *E. phaseoloides* auct. [non (L.) Merr.] *E. scandens* auct. [non (L.) Benth.] p.p. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 174).

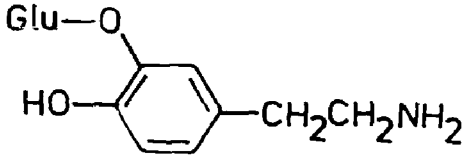
O-(β-D-Glucopyranosyl)-L-tyrosine isolated from seeds (*Biochem. Physiol. Alkaloides Int. Symp.* 4th 1969, 113; *Chem. Abstr.* 1972, *77*, 98695 t; *Phytochemistry* 1973, *12*, 2243); a volatile gas liberated during acid hydrolysis of crude saponin identified as methylmercaptan; echinocystic acid isolated from acid sapogenin fraction of the hydrolysate (*J. Indian Chem. Soc.* 1972, *49*, 1199); β-sitosterol, α-amyrin, quercetin, gallic acid and cyanidin chloride isolated from seeds (*Curr. Sci.* 1974, *43*, 181); dopamine-3-O-glucoside isolated from seeds (*Phytochemistry* 1973, *12*, 2243); prosapogenin A, β-sitosterol and lupeol isolated from seeds; hydrolysis of prosapogenin A yielded entagenic acid and D-glucose, L-arabinose and D-xylose (1:1:1) (*Indian J. Pharm.* 1975, *37*, 67); structure of entagenic acid confirmed (*J. Indian Chem. Soc.* 1978, *55*, 743); myristic, palmitic, stearic, arachidic, behenic, oleic, linoleic and linolenic acids obtained from seed oil hydrolysate; triglycerides comprised of monosaturated diolein

and dilinolein, saturated oleolinolein, dioleolinolein, triolein, oleodilinolein and trilinolein (*J. Sci. Food Agric.* 1978, *29*, 677; *Chem. Abstr.* 1979, *90*, 148437 b).

NEW COMPOUNDS



O-(β-D-Glucopyranosyl)-α-L-tyrosine



Dopamine-3-O-glucoside

E. scandens Benth.; see *E. pursaetha* DC. ssp. *pursaetha*

ENTEROLOBIUM (Mimosaceae)

E. saman Prain; see *Samanea saman* (Jacq.) Merr.

EPHEDRA (Ephedraceae)

E. intermedia Schrenk & Mey (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 108).

(-)Epicatechol, (-)epicatechol gallate and (-)epigallocatechol isolated from shoots (*Fenol'nye Soedin. Ikh Fiziol. Svoistva Mater. Vses. Simp. Fenol'nym Soedin.* 2nd, 1971 [pub. 1973], 141; *Chem. Abstr.* 1974, *81*, 166323 e).

EPILOBIUM (Onagraceae)

E. angustifolium L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 108).

Phytohemagglutinin isolated (USSR 396,040 (1974) Feb. 25; *Chem. Abstr.* 1974, *81*, 140866 j).

BIOLOGICAL ACTIVITY

Phytohemagglutinin showed antitumor activity (USSR 396,040 (1974) Feb. 25; *Chem. Abstr.* 1974, *81*, 140866 j).

E. hirsutum L. syn. *E. hirsutum* L. var. *sericeum* Clarke, *E. hirsutum* L. var. *lactum* Clarke (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 108).

A new triterpene acid - 23-hydroxytormentic acid - isolated from leaves and flowers along with palmitic, stearic, linoleic and oleanolic acids (*An. Quim.* 1979, *75*, 135; *Chem. Abstr.* 1979, *91*, 57219 m).

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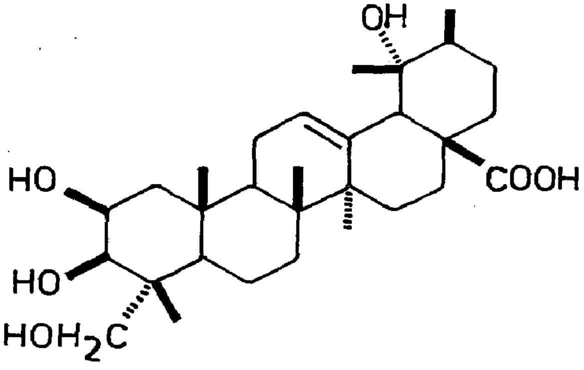


23-Hydroxytormentic acid

E. hirsutum L. var. *lactum* Clarke; see *E. hirsutum* L.

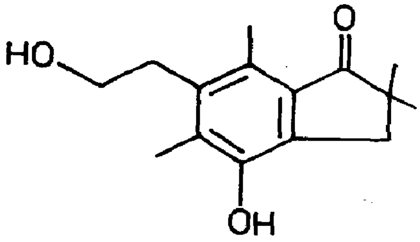
E. hirsutum L. var. *sericeum* Clarke; see *E. hirsutum* L.

EQUISETUM (Equisetaceae)

E. arvense L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 174).

Apigenin-5-O-β-D-glucopyranoside isolated from aerial parts (*Khim. Prir. Soedin.* 1974, *10*, 666; *Chem. Abstr.* 1975, *82*, 121650 p); kaempferol and its 3-sophoroside, quercetin and its 3-glucopyranoside (isoquercitrin) isolated (*Khim. Prir. Soedin.* 1974, *10*, 794; *Chem. Abstr.* 1975, *82*, 108840 f; *Khim. Prir. Soedin.* 1978, *14*, 508; *Chem. Abstr.* 1978, *89*, 211930 d); naringenin, dihydrokaempferol and dihydroquercetin isolated (*Khim. Prir. Soedin.* 1975, *11*, 424; *Chem. Abstr.* 1976, *84*, 2235 p); p-hydroxybenzoic, vanillic, protocatechuic, gallic, p-coumaric, ferulic and caffeic acids found to be present (*Khim. Prir. Soedin.* 1975, *11*, 416; *Chem. Abstr.* 1976, *84*, 40719 g); isolation of saponaretin and a new indanone compound which was characterised as 2,2,5,7-tetramethyl-4-hydroxy-6-(2-hydroxyethyl)indanone (I) (*Khim. Prir. Soedin.* 1978, *14*, 508; *Chem. Abstr.* 1978, *89*, 211930 d); detection of aconitic, arabinonic, citric, fumaric, gluconic, glyceric, malic, malonic, phosphoric, quinic and threonic acids by GLC and GC (*Acta Pharm. Suec.* 1978, *15*, 141; *Chem. Abstr.* 1978, *89*, 87162 p); genkwanin and luteolin isolated (*Khim. Prir. Soedin.* 1978, *14*, 807; *Chem. Abstr.* 1979, *90*, 200280 m).

NEW COMPOUNDS

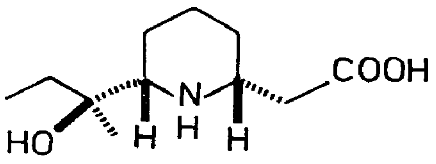


I

E. palustre L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 174).

Absolute configurations of (+)palustrine and (+)palustridine monohydrochloride and (-)dihydropalustraminic acid assigned (*Helv. Chim. Acta* 1978, *61*, 905, 921).

NEW COMPOUNDS



Dihydropalustraminic acid

EREMURUS (Liliaceae)

E. himalaicus Baker

Eng.- Himalayan desert candle.

Hordenine isolated from roots (*Indian J. Chem.* 1976, *14*B, 475).

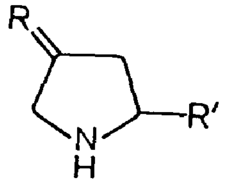
Distribution : Western Himalayas, Kashmir and Himachal Pradesh, alt. 2000-3000 m.

ERIOBOTRYA (Rosaceae)

E. japonica (Thunb.) Lindl. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 175).

4-Methylene-dl-proline (I) isolated from seeds (*Phytochemistry* 1972, *11*, 745); trans-4-hydroxymethyl-D-proline (II) isolated from seeds (*Phytochemistry* 1972, *11*, 751).

NEW COMPOUNDS



I

R = CH_2, R′ = COOH

II

R = β-CH_2OH,H, R′ = α-COOH

ERIOLEANA (Sterculiaceae)

E. hookeriana Wt. & Arn.

Tel. - Narubotuku; Tam. - Peruduppai, Pulicevandi; Kan. - Dandiyase, Dhasiro; Mal. - Guakasi; Oriya - Bonohandi; Bihar - Bundum, Ganguli.

Lupeol, α-amyrin, β-sitosterol and β-amyrin acetate isolated (*Indian J. Pharm.* 1977, *39*, 17).

Distribution : Gangetic plains, Bhutan and Deccan Peninsula, ascending to 1200 m.

ERUCA (Brassicaceae)

E. sativa Mill. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 175).

Glucoerucin (4-methylthiobutyl glucosinolate) isolated from seeds (*Arch. Pharm.* 1970, *303*, 330; *Chem. Abstr.* 1970, *73*, 28824 c).

ERVATAMIA (Apocynaceae)

E. coronaria Stapf; see *Tabernaemontana divaricata* (L.) R. Br. ex R. & S.

E. divaricata (L.) Alston; see *Tabernaemontana divaricata* (L.) R. Br. ex R. & S.

E. heyneana (Wall.) T. Cooke syn. *Tabernaemontana heyneana* Wall. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 176).

Methanol extract of leaves showed significant activity against B16 melanoma in mice (*Indian J. Exp. Biol.* 1979, *17*, 212).

Coronaridine, voacangine, ibogamine, 19-oxocoronaridine and pseudoindoxyl of voacangine isolated from roots (*J. Pharm. Sci.* 1973, *62*, 1199).

BIOLOGICAL ACTIVITY

Coronaridine prevented pregnancies in adult female rats, on oral administration (*J. Pharm. Sci.* 1973, *62*, 1199).

E. sphaerocarpa (Blume) Burke syn. *Tabernaemontana sphaerocarpa* Blume

Dregamine and tabernaemontanine isolated from stem bark and leaves; production of alkaloids was influenced by seasonal variations with maximum accumulation in November (*Sci. Cult.* 1973, *39*, 259).

Distribution : Native of Java, now naturalised in India and grown in gardens including Indian Botanic Garden, Howrah.

E. wallichiana (Steud.) Mehrotra & Rastogi Comb. nov. syn. *Tabernaemontana wallichiana* Steud. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 176).

Voacangine (0.09), voacristine (0.06) and coronaridine (0.04%) isolated from stem bark; first two bases and isovoacangine from leaves (*Indian J. Chem.* 1976, *14*B, 385).

ERVUM (Papilionacea)

E. lens L.; see *Lens culinaris* Medik.

ERYSIMUM (Brassicaceae)

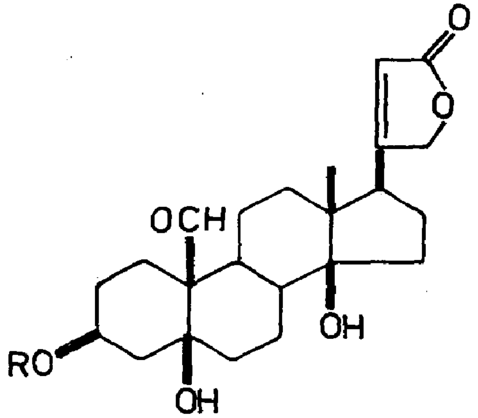
E. altacium C.A. Mey (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 176).

Deglucocheirotoxin, D-gulomethylose and eridiffuside, mp. 192°, isolated (*Khim. Prir. Soedin.* 1971, *7*, 844, *Chem. Abstr.* 1972, *76*, 124112 b).

E. repandum L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 110).

Thirteen cardenolides isolated from seeds of which six identified as glucostrophalloside, strophalloside, glucoperiplorhamnoside, periplorhamnoside, periplogenin and strophanthidin (*Khim. Prir. Soedin.* 1977, *13*, 581; *Chem. Abstr.* 1977, *87*, 197265 r; *Khim. Prir. Soedin.* 1978, *14*, 533; *Chem. Abstr.* 1978, *89*, 176380 a; *IUPAC Int. Symp. Chem. Natural Prod.* 2nd 1978, 348; *Chem. Abstr.* 1979, *91*, 189812 j; *Farmatsiya* 1978, *28*, 17; *Chem. Abstr.* 1978, *89*, 211969 y; *Probl. Farm.* 1978, *6*, 39; *Chem. Abstr.* 1978, *89*, 220790 k).

NEW COMPOUNDS



Glucostrophalloside
R = D-Allose(6-deoxy)(4→1)Glu

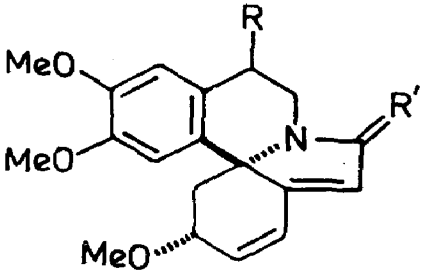
ERYTHRINA (Papilionaceae)

E. arborescens Roxb.

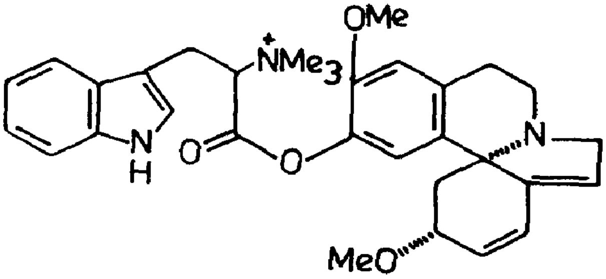
A new alkaloid - erythrascine - along with orientaline isolated from seeds (*Phytochemistry* 1972, *11*, 2101); seed oil composed of palmitic (13.4), stearic (1.2), oleic (44.1), linoleic (37.3), arachidic (0.3), eicosanoic (1.0) and behenic (2.7%) acids (*Indian J. Technol.* 1972, *10*, 115; *Chem. Abstr.* 1973, *78*, 40462 u); three new nonphenolic bases - erythrabine, erysotramidine and 11-hydroxyerysotrine - along with erysodine, erysotrine, erythratidine, N-nororientaline and erybidine isolated from leaves and characterised (*Yakugaku Zasshi* 1973, *93*, 1611; *Chem. Abstr.* 1974, *80*, 68387 p; *Yakugaku Zasshi* 1973, *93*, 1617; *Chem. Abstr.* 1974, *80*, 48212 z); structure of a new alkaloid - erysophorine - isolated from seeds (*Phytochemistry* 1974, *13*, 2603); sitosterol, stigmasterol and campesterol isolated from bark (*Indian J. Chem.* 1976, *14*B, 388).

Distribution : Garhwal to Sikkim and Meghalaya, ascending to 2100 m.

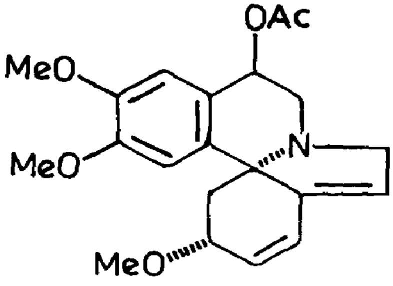
NEW COMPOUDNS



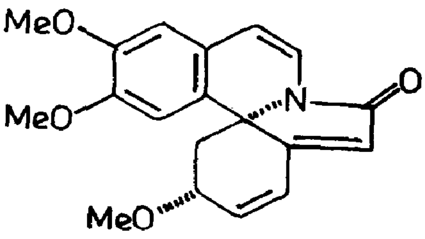
Erysotramidine
R = H, R′ = O
11-Hydroxyerysotrine
R = OH, R′ = H,H



Erysophorine



Erythrascine



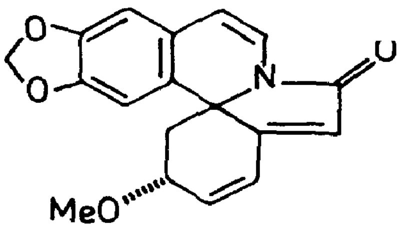
Erythrabine

E. crysta-galli L.

N-Nororientaline, erybidine, erythraline, erytrinine and erythratine isolated from leaves, trunk and roots (*Yakugaku Zasshi* 1973, *93*, 1674; *Chem. Abstr.* 1974, *80*, 68391 k; *Chem. Pharm. Bull.* 1976, *24*, 52); structure elucidation of crystamidine isolated along with erysodine and erysotrine (*Chem. Pharm. Bull.* 1976, *24*, 52).

Distribution : A native of Brazil, grown as ornamental in India.

NEW COMPOUDNS



Crystamidine

E. fusca Lour. syn. *E. ovalifolia* Roxb.

Erysotrine purified as picrate and identified (*J. Chem. Soc.* Perkin 1 1973, 874).

Distribution : Forests of Assam and Bengal.

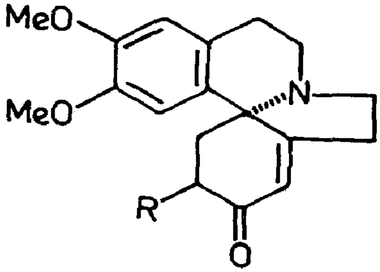
E. indica Lamk.; see *E. variegata* L.

E. lithosperma (Hassk.) Merr. syn. *E. lithosperma* Miq. (non Blume ex Hassk.)

An alkaloid - erythrinine - isolated from seeds (*Proc. Nat. Acad. Sci.* India 1969, *39*A, 263); N-norprotosinomenine, protosinomenine and erysodienone isolated (*Aust. J. Chem.* 1971, *24*, 2733); erysotrine, erythramine, erysodine, erythraline, erythrinine and hypaphorine from trunk bark; erysodine, hypaphorine, erysopine and erysonine from seeds; hypaphorine and erysopine from leaves (*Curr. Sci.* 1972, *41*, 578); erythratidine, epierythratidine, erythratidinone and 3-demethoxyerythratidinone isolated and characterised (*J. Chem. Soc.* Perkin 1 1973, 874).

Distribution : Introduced into India, grown in coffee and tea plantations as a shade tree.

NEW COMPOUNDS



3-Demethoxyerythratidinone
R = H
Erythratidinone
R = α-OMe

E. lithosperma Miq.; see *E. lithosperma* (Hassk.) Merr.

E. ovalifolia Roxb.; see *E. fusca* Lour.

E. resupinata Roxb.

Erysodine, erysovine and erysopine isolated from seeds (*Lloydia* 1977, *40*, 471).

Distribution : Upper Gangetic plains.

E. stricta Roxb.

Palmitic (13.6), stearic (6.1), oleic (53.5), linoleic (10.2), arachidic (2.0), eicosanoic acid (3.4), behenic (9.0) and lignoceric (2.2%) acids estimated in seed oil (*Indian J. Technol.* 1972, *10*, 115; *Chem. Abstr.* 1973, *78*, 40462 u).

Distribution : Western peninsula.

E. suberosa Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 177).

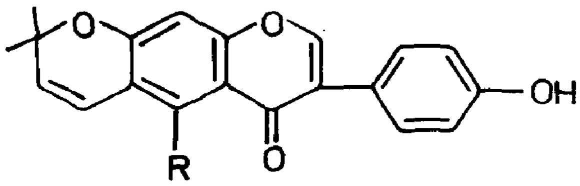
Erythraline, erysodine, erysotrine and hypaphorine isolated from seeds; erysotrine also isolated from leaves (*J. Pharm. Sci.* 1970, *59*, 1179; *Lloydia* 1972, *35*, 92); delphinidin-3,5-diglucoside and cyanidin-3,5-diglucoside isolated from flowers (*Proc. Nat. Acad. Sci.* India 1977, *47*A, 71; *Chem. Abstr.* 1978, *89*, 176339 u).

E. variegata L. syn. *E. variegata* L. var. *orientalis* (L.) Merr., *E. indica* Lam. (*Compend. Indian Med. Plants*, Vol 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 177)

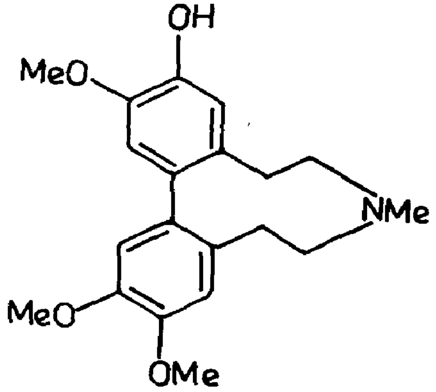
Total alkaloidal fraction from bark caused smooth muscle relaxation of isolated rabbit ileum and inhibited spontaneous rhythmic contraction of isolated rat uterus in concentration of 0.5-2.0 mg/ml. These alkaloids showed CNS depressant and anticonvulsant actions and may be clinically useful as muscle relaxants and as sedatives (*J. Res. Indian Med.* 1971, *6*, 235); total alkaloid fraction from bark showed neuromuscular blocking, smooth muscle relaxant, CNS depressant and anticonvulsant effects (*J. Pharm. Sci.* 1972, *61*, 1274).

Erythraline and erysovine isolated from seeds (*Planta Med.* 1971, *19*, 71; *J. Pharm. Sci.* 1972, *61*, 1274; *Lloydia* 1977, *40*, 471); erysotrine, erysodine, erysopine, erysopitine, erysodienone and erysonine along with three carboxylated indole-3-alkylamines - hypaphorine, its methyl ester and N,N-dimethyltryptophan methyl ester - isolated from various parts of plant (*J. Pharm. Sci.* 1972, *61*, 1274; *Lloydia* 1977, *40*, 471; *ibid.* 1978, *41*, 342); scoulerine, (+)coreximine, l-reticuline and erybidine isolated from leaves (*Yakugaku Zasshi* 1973, *93*, 1671; *Chem. Abstr.* 1974, *80*, 68390 j); three new isoflavones - erythrinins A, B and C - in addition to osajin, alpinum isoflavone, oxyresveratol and dihydroxyresveratol isolated from bark (*Indian J. Chem.* 1977, *15B*, 205); erythrartine isolated from flowers; choline isolated from seeds and flowers; absolute configuration of C-11 in erythrinine and erythrascine (*Lloydia* 1978, *41*, 342).

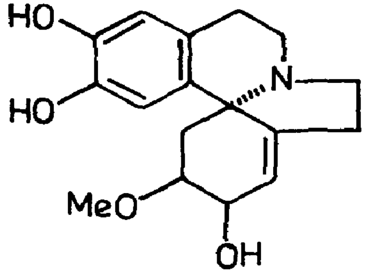
NEW COMPOUDNS



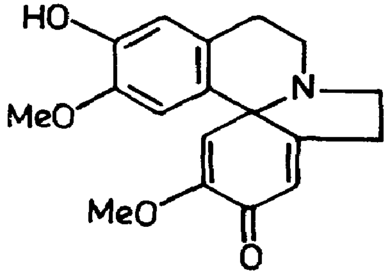
Erythrinin A
R = H
Alpinum isoflavone
R = OH



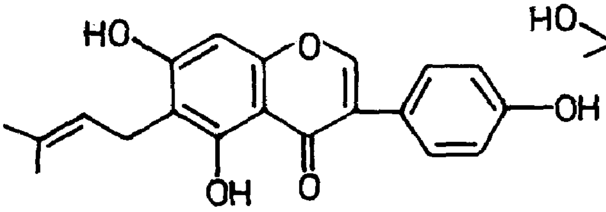
Erybidine



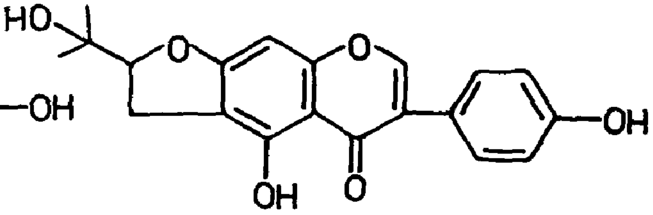
Erysopitine



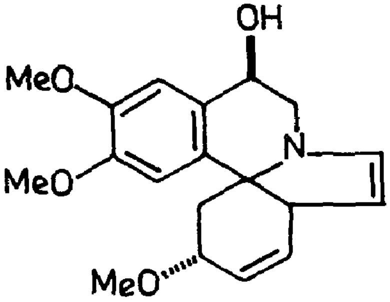
Erysodienone



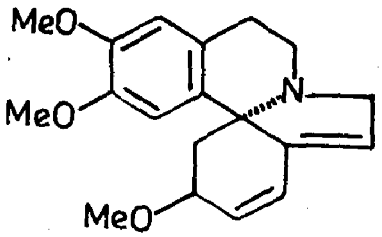
Erythrinin B



Erythrinin C



Erythrartine



Erysotrine

E. variegata L. var. *orientalis* (L.) Merr.; see *E. variegata* L.

ERYTHROXYLUM (Erythroxylaceae)

E. coca Lam. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 111).

Detection of cocaine by MS in South American plant (*Phytochemistry* 1977, *16*, 1753); stereospecific synthesis of cocaine (*Tetrahedron Lett.* 1978, 1733).

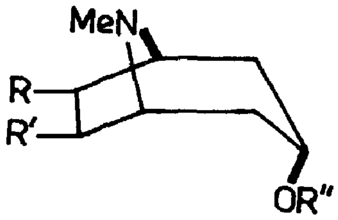
BIOLOGICAL ACTIVITY

Cocaine hydrochloride (10 mg/kg, i.p.) chronically injected in rats for 60 days enhanced spontaneous locomotor activity (*Res. Commun. Psychol. Psychiatry Behav.* 1977, 2, 203; *Chem. Abstr.* 1977, *88*, 45012 p).

E. monogynum Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 177).

1αH,5αH-Tropan-3α-yl-3′,4′,5′-trimethoxybenzoate (I) and 1αH,5αH-tropan-3α-yl-3′,4′,5′-trimethoxycinnamate (II) isolated from roots (*J. Pharm. Pharmacol.* 1974, 111; *J. Chem. Soc.* Perkin 1 1976, 1550); two new bases - 1αH,5αH-tropan-3α,6β-diol-3-(3′,4′,5′-trimethoxycinnamate)-6-benzoate (III) and 1αH,5αH-tropan-3α,6β,7β-triol-3-(3′,4′,5′-trimethoxybenzoate) (IV) - isolated from roots (*J. Chem. Soc.* Perkin 1 1976, 1550).

NEW COMPOUDNS



I

R,R′ = H, R″ = Benzoyl(3′,4′,5′-OMe)

II

R,R′ = H, R″ = Cinnamoyl(3′,4′,5′-OMe)

III

R = O-Benzoyl, R′ = H, R″ = Cinnamoyl(3′,4′,5′-OMe)

IV

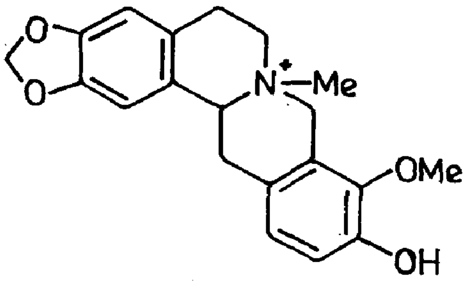
R,R′ = OH, R″ = Benzoyl(3′,4′,5′-OMe)

ESCHSCHOLZIA (Papaveraceae)

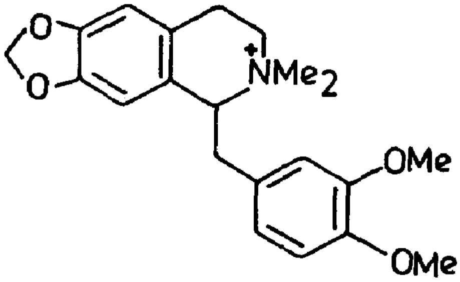
E. californica Cham. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 179).

Escholidine isolated from roots along with escholinine, escholine, californidine and (-)α-canadine methohydroxide (*Collect. Czech. Chem. Commun.* 1970, *35*, 2597).

NEW COMPOUNDS



Escholidine



Escholinine

ETHULIA (Asteraceae)

E. conyzoides L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 111).

Ethuliacoumarin and cycloethuliacoumarin isolated from aerial parts and their structures determined (*Phytochemistry* 1977, *16*, 1092).

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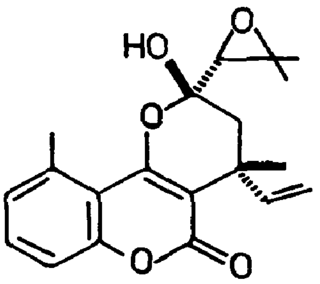
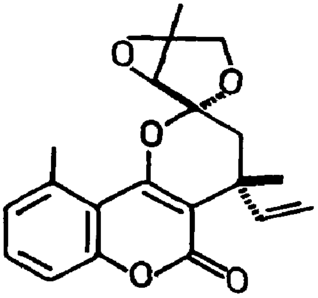


Ethuliacoumarin



Cycloethuliacoumarin

EUCALYPTUS (Myrtaceae)

E. camaldulensis Dehnh.

Eng. - Eucalyptus.

Eucalyptol (57.57), terpineol (11.18), α-phellandrene (5.26) and α-pinene (2.30%) estimated by GC in essential oil (1.3%) obtained from leaves (*Ankara Univ. Eczacilik Fak. Mecm.* 1976, *6*, 181; *Chem. Abstr.* 1977, *87*, 172699 x).

Distribution : Native of Australia, reported to be planted in upper Gangetic plains and on hills upto 1800 m.

E. citriodora Hook. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 112).

Detection of citronellal, citronellol and cineole in the ratio 72:27:1 along with α- and β-pinene, cineole, p-cymene, linalool, isopulegol, citronellyl acetate, geraniol and seven minor unidentified compounds in essential oil by GLC (*Flavour Ind.* 1972, *3*, 416; *Chem. Abstr.* 1972, *77*, 161949 w; *Indian J. Pharm.* 1976, *38*, 57); eucalyptin (0.046%) isolated from leaves (*Rev. Soc. Quim. Mex.* 1974, *18*, 269; *Chem. Abstr.* 1975, *83*, 55665 q).

E. globulus Labill. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 180).

Cysteine, ornithine, asparagine, glycine, glutamic acid, threonine, α- and β-alanine and norvaline from fruits (*J. Sci. Res.* 1971, *3*, 1; *Chem. Abstr.* 1974, *80*, 45669 t); detection of α-pinene, cineole, α-pinocarvone, citronellal, d-myrtenal, carvone, cuminaldehyde, citral, aromadendrene, globulol, eudesmol, geranyl acetate, S-guaiazulene, cinnamic acid and eudesmyl acetate; alloaromadendrene, epiglobulol, ledol and viridifloral; 1,8-cineole, α-, β- and γ-terpinene, β-pinene, terpinen-4-ol, linalool oxide, α-gurjunene, piperitone, eremophilene and γ-cadinene in essential oil by GLC (*Ann. Quim.* 1977, *73*, 751; *Chem. Abstr.* 1977, *87*, 156994 j; *Indian Perfum.* 1972, *16*, 5; *Chem. Abstr.* 1974, *80*, 100103 f; *J. Agric. Food Chem.* 1979, *27*, 432; *Chem. Abstr.* 1979, *90*, 135071 c); gallic, caffeic, ferulic and protocatechuic acids isolated from leaves (*Plant. Med. Phytother.* 1976, *10*, 24; *Chem. Abstr.*

1976, *85*, 25311 v); quercitol, quercitrin, rutin, hyperoside and quercitol-3-glucoside isolated from leaves (*Plant. Med. Phytother.* 1976, *10*, 30; *Chem. Abstr.* 1976, *85*, 30675 w).

E. viridis R.T. Baker

Eng. - Eucalyptus.

Detection of cineole, α-pinene, β-pinene, camphene, p-cymene, isopulegol, cryptone, α-terpineol and geraniol in leaf essential oil by GLC (*Indian J. Pharm. Sci.* 1979, *41*, 80).

Distribution : Introduced in Jodhpur and elsewhere in India.

EUGENIA (Myrtaceae)

E. caryophyllata Thunb.; see *Syzygium aromaticum* (L.) Merr. & Perry

E. caryophyllus (Sprengel) Bullock & Harrison; see *Syzygium aromaticum* (L.) Merr. & Perry

E. formosa Wall.; see *Syzygium formosum* (Wall.) Masamune

E. jambolana Lam.; see *Syzygium cumini* (L.) Skeels

E. jambos L.; see *Syzygium jambos* (L.) Alston

E. javanica Lamk.; see *Syzygium samarangese* (Bl.) Merr. & Perry

EUODIA [EVODIA] (Rutaceae)

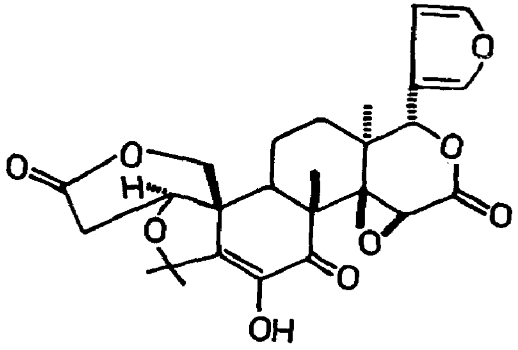
E. fraxinifolia (D. Don) Hook.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 181).

β-Sitosterol, limonin and isobauerenol isolated (*J. Indian Chem. Soc.* 1970, *47*, 91).

E. glabrifolia (Champ.) Balak. syn. *E. meliaefolia* (Hance) Benth.

Isobauerenol isolated from rootbark; limonin, limonin diosphenol (evodol), β-sitosterol, campesterol and stigmasterol identified in root bark by GLC (*Pharmazie* 1978, *33*, 372; *Chem. Abstr.* 1978, *89*, 143329 n).

NEW COMPOUNDS



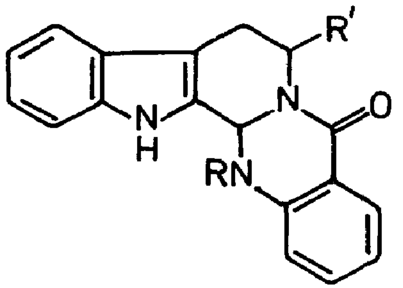
Limonin diosphenol

E. meliaefolia (Hance) Benth.; see *E. glabrifolia* (Champ.) Balak.

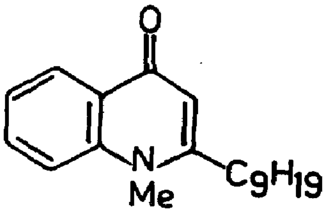
E. ruticarpa (Juss.) Benth. (*Compend. Indian Med. Plants,* Vol. 1; Rastogi & Mehrotra, PID, New Delhi, 1990, p. 181).

1-Methyl-2-pentadecyl-4(1H)-quinolone, 1-methyl-2-tridecyl-4(1H)-quinolone (dihydroevocarpine) and 1-methyl-2-undecyl-4(1H)-quinolone isolated from leaves and fruits (*Agric. Biol. Chem.* 1976, *40*, 605; *Chem. Abstr.* 1976, *84*, 180446 r); in addition to rutaecarpine and evodiamine, three new alkaloids - dihydrorutaecarpine and its 14-formyl derivative and 1-methyl-2-nonyl-4(1H)-quinolone (I) - isolated from fruits (*Agric. Biol. Chem.* 1978, *42*, 1515; *Chem. Abstr.* 1978, *89*, 215635 j); synephrine isolated from fruits (*Shoyakugaku Zasshi* 1979, *33*, 35; *Chem. Abstr.* 1979, *91*, 181333 h); a new indolopyridoquinazoline alkaloid isolated from fruits and characterised as (7S, 13bS)-7-carboxy-8,13,13b,14-tetrahydro-14-methylindolo(2′,3′,3,4) pyrido[2,1-b)quinazolin-5(7H)-one (II) (*Experientia* 1979, *35*, 156).

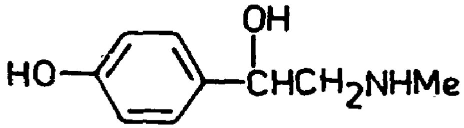
NEW COMPOUNDS



Dihydrorutaecarpine
R,R′ = H
14-Formylruteacarpine
R = CHO, R′ = H
II
R = Me, R′ = COOH



I



Synephrine

EUONYMUS (Celastraceae)

E. pendulus Wall.

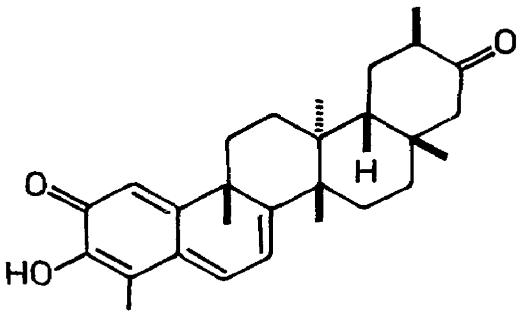
Isohexacosane, cerotic acid, friedelin, epifriedelinol, β-sitosterol and dulcitol isolated from twigs (*Planta Med.* 1978, *34*, 211).

Distribution : Himalayas, from Kashmir to Nepal and north-eastern India, alt. 1800-2600 m.

E. tingens Wall. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 181).

Tingenone and 20-hydroxytingenone isolated from bark; crystal structure of tingenone (*J. Chem. Soc.* Perkin 1 1973, 2721).

NEW COMPOUNDS



Tingenone

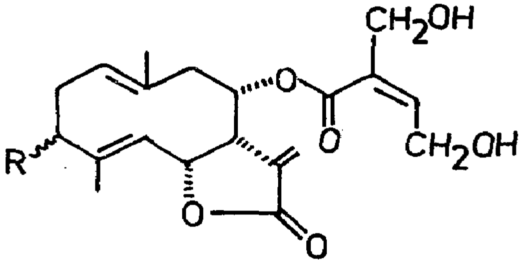
EUPATORIUM (Asteraceae)

E. ayapana Vent.; see *E. triplinerve* Vahl

E. cannabinum L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 113).

Revised stereostructure of eupatoriopicrin; structure of eucannabinolide also elucidated (*Collect. Czech. Chem. Commun.* 1972, *37*, 1546).

NEW COMPOUNDS



Eupatoriopicrin
R = H
Eucannabinolide
R = OAc

E. chinense L. syn. *E. reevesii* Wall. ex DC.

Taraxasterol, taraxasteryl palmitate and taraxasteryl acetate isolated from flowers and leaves (*Yakugaku Zasshi* 1974, *94*, 338; *Chem. Abstr.* 1974, *81*, 117062 k).

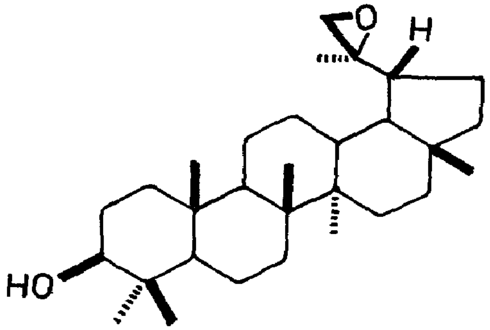
Distribution : Himalayas from Himachal Pradesh to Bhutan, alt. 600-1800 m.

E. odoratum L. syn. *Chromolaena odorata* (L.) King & Robinson (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 182).

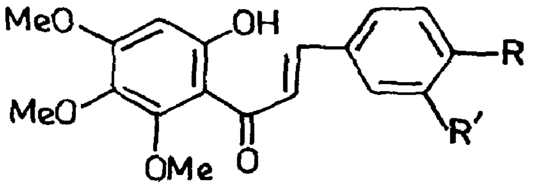
Isosakuranetin, acacetin and a new chalcone - odoratin (2′-hydroxy-4′,4′,5′,6′-tetramethoxychalcone) - isolated from leaves (*Phytochemistry* 1973, *12*, 667; *Bose Res. Inst.*, Calcutta 1974, *37*, 25; *Chem. Abstr.* 1975, *83*, 160778 b; *Lloydia* 1978, *41*, 186); lupeol, β-amyrin

and salvigenin isolated from whole plant (*Phytochemistry* 1974, *13*, 284; *Indian J. Chem.* 1977, *15*B, 806); isolation and structure elucidation of a new triterpenoid as 20,29-epoxylupeol (*Indian J. Chem.* 1977, *15*B, 806); chalcones (I) and (II), optically inactive 4′-hydroxy-5,6,7-trimethoxyflavanone (III) along with scutellarein tetramethyl ether and sinensetin isolated and characterised (*Phytochemistry* 1978, *17*, 1807); isosakuranetin-7-methylether and 4′,5-dihydroxy-3′,7-dimethoxyflavone (IV) isolated from aerial parts (*Lloydia* 1978, *41*, 186).

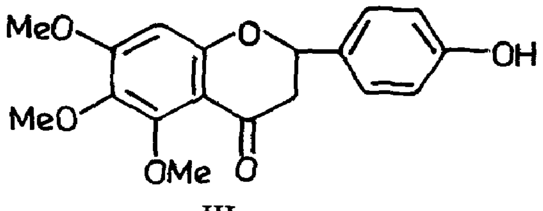
NEW COMPOUNDS



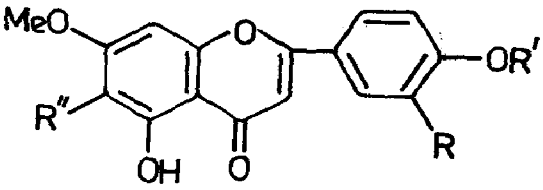
20,29-Epoxylupeol



Odoratin
R = OMe, R′ = H
I
R = OH, R′ = H
II
R,R′ = OMe



III



IV
R = OMe, R′,R″ = H
Salvigenin
R = H, R′ = Me, R″ = OMe

E. reevesii Wall. ex DC.; see *E. chinense* L.

E. riparium Regel.; see *Ageratia riparia* (Regel.) R. M. King & Robins

E. triplinerve Vahl. syn. *E. ayapana* Vent. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 113).

Ayapanin, mp. 117°, ayapin, mp. 231° and stigmasterol isolated from leaves (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 155).

EUPHORBIA (Euphorbiaceae)

E. cornigera Boiss. syn. *E. pilosa* L. var. *cornigera* (Boiss.) Hook.f.

Ellagic acid and 3,3′-di-O-methylellagic acid isolated from roots (*Phytochemistry* 1974, *13*, 867).

Distribution : Kashmir and Himachal Pradesh, alt. 1800-2700 m.

E. geniculata Ort. ex Boiss. see *E. heterophylla* L.

E. helioscopia L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 182).

Quercetin-3β-glucoside, quercetin-3β-galactoside and quercetin 3β-galactoside-2''-gallate isolated (*Planta Med.* 1975, *27*, 301); wax esters of neutral lipids isolated from leaves, composed of lauric, palmitic, stearic, oleic, linoleic, arachidic and behenic acids; octacosyl alcohol and β-sitosterol present both free and esterified; heptacosane also present (*Pakistan J. Sci. Ind. Res.* 1977, *20*, 380; *Chem. Abstr.* 1979, *91*, 9402 u).

E. heterophylla L. syn. *E. prunifolia* Jacq., *E. geniculata* Ort. ex Boiss.

Detection of alanine, cysteine, serine, aspartic acid, methionine, proline, glutamic acid, glucose, rhamnose and galactose in leaf extract by PC (*J. Inst. Chemists,* Calcutta 1976, *48*, 192; *Chem. Abstr.* 1977, *86*, 68376 h); kaempferol, its 3-rutinoside, quercetin, its 3-rhamnoside shown to be present by TLC; quercitrin isolated (*Pharmazie* 1977, *32*, 538; *Chem. Abstr.* 1977, *87*, 197350 q); β-amyrin acetate, β-sitosterol, campesterol, stigmasterol and cholesterol isolated (*Pharmazie* 1978, *33*, 540; *Chem. Abstr.* 1978, *89*, 176366 a).

Distribution : Native of tropical America, naturalised as weed in many parts of India, alt. 800 m.

E. hirta L. syn. *E. pilulifera* auct. (non L.) (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 113).

Leucocyanidol, quercitol, camphol, quercitrin and quercitol derivatives containing rhamnose and chlorophenolic acid isolated (*Plant. Med. Phytother.* 1972, *6*, 106; *Chem. Abstr.* 1972, *77*, 98756 p).

E. hypericifolia L.; see *E. indica* Lamk.

E. indica Lamk. syn. *E. hypericifolia* auct. (non L.) p.p (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 114).

Quercitrin, quercetin and ellagic acid isolated; rhamnetin-3-rhamnoside and kaempferol detected by TLC and PC (*Fitoterapia* 1977, *48*, 99); taraxerol, octacosanol and its homologues, β-sitosterol, stigmasterol and campesterol isolated (*Planta Med.* 1977, *32*, 177).

E. jacquemontii Boiss.

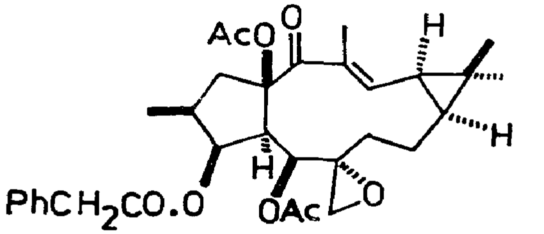
Taraxerone, sitosterol and lupeol isolated (*Phytochemistry* 1973, *12*, 1819); alanine, aspartic acid, leucine, norvaline, glutamic acid, glucose, rhamnose, fructose and galacturonic acid detected in stem by PC (*J. Inst. Chemists*, Calcutta 1976, *48*, 192; *Chem. Abstr.* 1977, *86*, 68376 h).

Distribution : Western Himalayas.

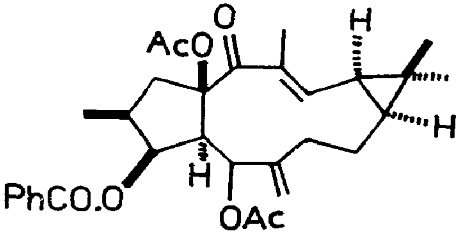
E. lathyrus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 183).

A new tricyclic diterpene - 6,20-epoxylathyrol - isolated as phenyl acetate-diacetate from irritant and carcinogenic seed oil; its crystal structure determined (*Tetrahedron Lett.* 1970, *2241*, 3071; *Phytochemistry* 1971, *10*, 2550; *Yakugaku Zasshi* 1973, *93*, 1052; *Chem. Abstr.* 1973, *79*, 136917 t); a diacetate-benzoate and diacetate-nicotinate of lathyrol and 2,4,6,8,10- tetradecapentaenoate of ingenol isolated from seed oil and latex (*Experientia* 1971, *27*, 1393); hentriacontane, taraxerone, taraxerol and betulin isolated from stem (*Phytochemistry* 1971, *10*, 2550); a new bicoumarin - euphorbetin - isolated from seeds (*Tetrahedron Lett.* 1972, 601); another bicoumarin - isoeuphorbetin - isolated as its tetramethyl ether from seeds and characterised (*Indian J. Chem.* 1973, *11*, 831).

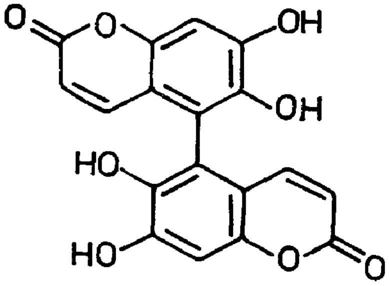
NEW COMPOUNDS



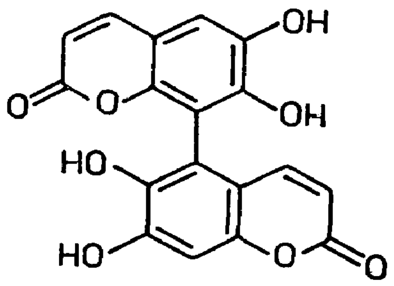
Diacetyl 6,20-epoxy lathyralphenyl acetate



Diacetyl lathyrol benzoate



Euphorbetin



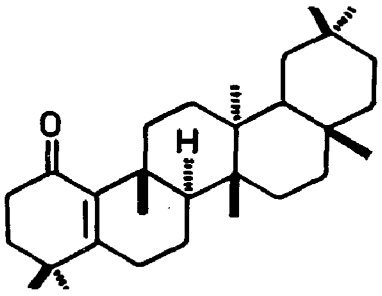
Isoeuphorbetin

E. neriifolia L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 183).

Extract of fresh stem showed significant local anaesthetic activity in tests on intradermal wheal in guinea pig and foot withdrawal reflex in frog (*Indian J. Pharmacol.* 1979, *11*, 239).

Structure of a new triterpene - glut-5(10)-en-1-one - isolated from leaves and stems along with friedelan-3α- and 3β-ol and taraxerol (*Tetrahedron* 1973, *24*, 3909).

NEW COMPOUNDS



Glut-5(10)-en-1-one

E. peplus L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 114).

Kaempferol-3-glucoside and quercetin-3-glucoside isolated from flowering and fruiting plants (*Planta Med.* 1973, *24*, 145).

E. pilosa L. var. *cornigera* (Boiss.) Hook.f.; see *E. cornigera* Boiss.

E. pilulifera L.; see *E. hirta* L.

E. protrata W. Ait.

Kaempferol, quercetin, its 3-rhamnoside and apigenin-7-glucoside detected by TLC; cosmosiin and rhamnetin-3-galactoside isolated (*Pharmazie* 1977, *32*, 538; *Chem. Abstr.* 1977, *87*, 197350 q); *β*-amyrin acetate, *β*-sitosterol, campesterol, stigmasterol and cholesterol isolated (*Pharmazie* 1978, *33*, 540; *Chem. Abstr.* 1978, *89*, 176366 a).

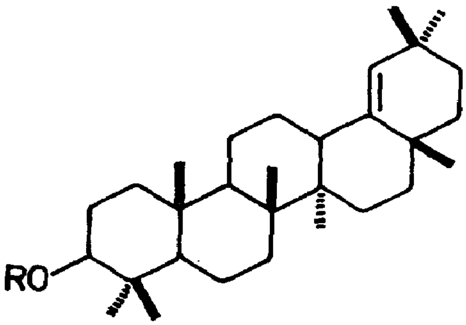
Distribution : Native of tropical America, naturalised as weed in many parts of India.

E. prunifolia Jacq.; see *E. heterophylla* L.

E. pulcherrima Willd. ex Klotzsch (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 183).

Pulcherrol isolated from latex identified as stereoisomer of *β*-amyrin (*Rev. Latinoam. Quim.* 1970, *1*, 68; *Chem. Abstr.* 1971, *74*, 108138 t); cycloartenol, *β*-amyrin, germanicol, germanicyl acetate and *β*-sitosterol isolated from latex (*Planta Med.* 1977, *32*, 1; *J. Indian Chem. Soc.* 1977, *54*, 388); in addition, new triterpenoid esters - germanicyl tetracosanoate and germanicyl behenate - along with 2-methylanthraquinone, epigermanicol, its acetate and octacosanol isolated (*J. Indian Chem. Soc.* 1977, *54*, 388); a new conjugated fatty acid - deca-2,4,6-trienoic acid - isolated and characterised (*Lipids* 1977, *12*, 707).

NEW COMPOUNDS



Germanicyl tetracosanoate
R = Tetracosanoyl
Germanicyl behenate
R = Docosanoyl

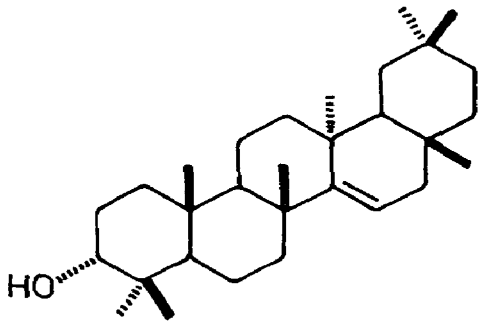
E. resinifera Berg. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 183).

(-)Quinic acid, D-(+)hydroxyglutaric acid, myoinositol, L-(-)inositol and vanillic acid isolated (*Acta Chem Scand.* 1969, *23*, 3609).

E. royleana Boiss. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 183).

A new triterpene - epitaraxerol - isolated and characterised (*Curr. Sci.* 1974, *43*, 10); ellagic acid, euphol, taraxerol, sitosterol, m-hydroxybenzoic acid, 7-hydroxy-3,4-benzcoumarin, 7-methoxy-3,4-benzcoumarin, 2',7-dihydroxy-3,4-benzcoumarin isolated both from latex of plant and shilajit (*J. Pharm. Sci.* 1976, *65*, 772).

NEW COMPOUNDS

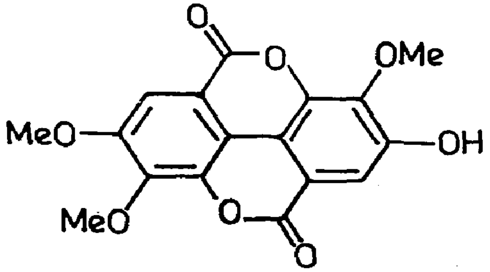


Epitaraxerol

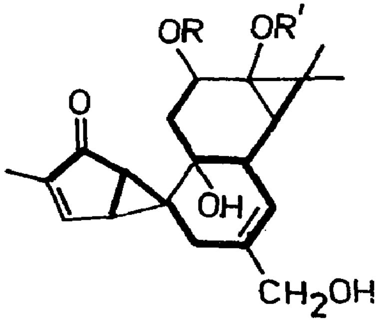
E. tirucalli L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 184).

Taraxerone, tirucallol, sitosterol and 3,4,3'-tri-O-methylellagic acid isolated (*Indian J. Chem.* 1977, *15B*, 564); structures of four new diterpenes (I-IV) isolated from latex (*Tetrahedron Lett.* 1977, 925).

NEW COMPOUNDS



3,4,3'-Tri-O-methylellagic acid



I

R = $CO(CH=CH)_3CH_2CH_2Me$, R' = Ac

II

R = Ac, R' = $CO(CH=CH)_3CH_2CH_2Me$

III

R = Ac, R' = $CO(CH=CH)_5CH_2CH_2Me$

IV

R = Ac, R' = $CO(CH=CH)_4(CH_2)_4Me$

E. wallichii Hook.f.

Ellagic acid and 3,3′-di-O-methylellagic acid isolated from roots (*Phytochemistry* 1974, *13*, 867); euphol and euphorbol isolated (*Planta Med.* 1979, *35*, 193).

Distribution : Himalayas from Kashmir to Nepal, alt. 3000-3600 m.

EUPHORIA (Sapindaceae)

E. longan (Lour.) Steud. syn. *Nephelium longana* (Lamk.) Camb., *Euphoria longana* Lamk. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 115).

Epifriedelinol, β-sitosterol, stigmasterol and its glucoside and 16-hentriacontanol isolated from leaves (*Phytochemistry* 1971, *10*, 2487).

E. longana Lamk.; see *E. longan* (Lour.) Steud.

EUPHRASIA (Scrophulariaceae)

E. officinalis L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 115).

Detection of aucubin, caffeic acid, ferulic acid, stigmasterol and sitosterol by TLC (*Planta Med.* 1973, *23*, 342).

EURYA (Theaceae)

E. japonica Thunb.

Chrysoeriol, hyperin and quercitrin isolated from leaves; chrysoeriol and betulic acid from bark (*Yakugaku Zasshi* 1974, *94*, 872; *Chem. Abstr.* 1974, *81*, 117107 d).

Distribution : Eastern Himalayas, Sikkim, Khasia Hills and hills of eastern and western peninsula, alt. 900-2100 m.

EVOLVULUS (Convolvulaceae)

E. alsinoides (L.) L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 116).

Betaine and a base, mp. 60°, isolated (*Indian J. Pharm.* 1969, *31*, 108).

EXCOECARIA (Euphorbiaceae)

E. indica (Willd.) Muell.-Arg. syn. *Sapium indicum* Willd. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 221).

Fruits used as fish poison; a weakly basic compound, mp. 271°, isolated from fruits along with three minor components, I, mp. 274° (0.18), II, mp. 274° dec. (0.0013) and III, mp. 271° dec. (0.003%) (*Sci. Res.* 1970, *7*, 120; *Chem. Abstr.* 1973, *78*, 1972 r).

EXOGONIUM (Convolvulaceae)

E. purga Benth. syn. *Ipomea purga* Hayne (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 116).

Convolvulin shown to be a new β-D-quinovoside of tetrahydroxydecanoic acid (*Phytochemistry* 1973, *12*, 1701).

FAGONIA (Zygophyllaceae)

F. arabica Hook.f.; see *F. schweinfurthii* Hadidi

F. cretica L.; see *F. schweinfurthii* Hadidi

F. schweinfurthii Hadidi syn. *F. cretica* auct. (non L.)

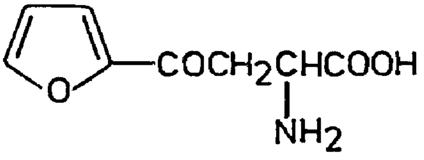
F. arabica sensu Hook.f. p.p. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 184).

Harmine, two unidentified compounds and three triterpenoids of oleanane group isolated (*Herba Pol.* 1975, *21*, 420; *Chem. Abstr.* 1976, *85*, 124189 t).

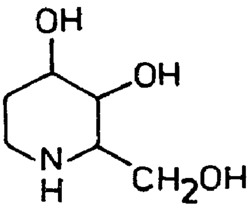
FAGOPYRUM (Polygonaceae)

F. esculentum Moench (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 185).

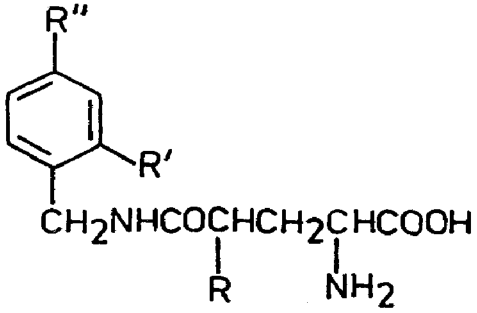
Kaempferol-3-rhamnosylglucoside, p-cumaroylquinic and feruloylquinic acids isolated from leaves (*Z. Pflanzenphysiol.* 1972, *68*, 115; *Chem. Abstr.* 1973, *78*, 26518 k); L-2-(2-furoyl)alanine (I) isolated from seeds and its structure elucidated (*Tetrahedron Lett.* 1973, 37); two new amides - N^5-(2-hydroxybenzyl)-allo-4-hydroxyglutamine (II) and N^5-(4-hydroxybenzyl)-L-glutamine (III) - isolated from seeds (*Agric. Biol. Chem.* 1973, *37*, 2749; *Chem. Abstr.* 1974, *80*, 80077 v); a new piperidine derivative - fagomine, mp. 176° - from seeds characterised as 3,4-dihydroxy-2-hydroxymethylpiperidine (*Agric. Biol. Chem.* 1974, *38*, 1111; *Chem. Abstr.* 1974, *81*, 148445 s); quercetin (0.0021), quercitrin (0.0047), hyperin (0.17) and rutin (0.006%) isolated from seeds (*Nippon Nogei Kagaku Kaishi* 1975, *49*, 53; *Chem. Abstr.* 1975, *83*, 4922 p).
NEW COMPOUNDS



I



Fagomine



II
R,R' = OH, R'' = H
III
R,R' = H, R'' = OH

BIOLOGICAL ACTIVITY

Rutin (100 and 200 mg/kg) and quercetin (100 and 200 mg/kg) when orally administered for 30 days produced dose-dependent increase in biliary secretion and increased faecal excretion of bile acids (*Fiziol. Patol. Organov Pishchevareniya* 1974, 67; *Chem. Abstr.* 1978, *88*, 306 w).

FAGRAEA (Loganiaceae)

F. fragrans Roxb. syn. *Cyrtophyllum peregrinum* Blume, *Fagraea wallichiana* Benth. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 89).

BIOLOGICAL ACTIVITY

Gentianine isolated from plant produced 20 or 30% analgesia in rats when given orally (50 or 100 mg/kg) (*Asian J. Med.* 1972, *8*, 334; *Chem. Abstr.* 1973, *78*, 11686 q).

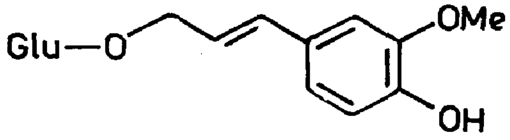
F. wallichiana Benth.; see *F. fragrans* Roxb.

FAGUS (Fagaceae)

F. sylvatica L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 185).

Squalene, cycloartenyl acetate, β-amyrin acetate, acetylmethyl betulinate, sitosterol, stigmasterol and dihydrositosterol isolated from wood (*Phytochemistry* 1973, *12*, 2068); cis-coniferyl alcohol and its glucoside - faguside - isolated from bark; faguside characterised as 1-O-(β-D-glucopyranosyl)-3-(3-methoxy-4-hydroxyphenyl)-2-propene (*Collect. Czech. Chem. Commun.* 1978, *43*, 774); leaves contained phlobatannin (*Farm. Pol.* 1978, *34*, 413; *Chem. Abstr.* 1978, *89*, 176396 k).

NEW COMPOUNDS



Faguside

FERNANDOA (Bignoniaceae)

F. adenophylla (Wall. ex G. Don) V. Steenis syn. *Bignonia adenophylla* Wall. ex G. Don, *Heterophragma adenophyllum* Seem. ex Benth. & Hook. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, p. 186).

n-Hentriacontanol and β-sitosterol isolated from bark (*J. Indian Chem. Soc.* 1973, *50*, 561).

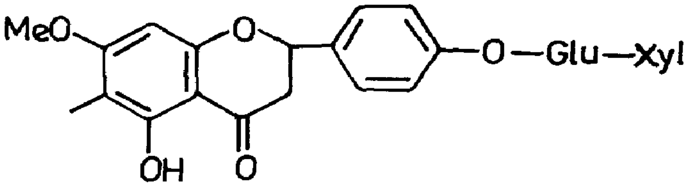
FERONIA (Rutaceae)

F. elephantum Correa; see *F. limonia* (L.) Swingle

F. limonia (L.) Swingle syn. *F. elephantum* Correa (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 186).

Ursolic acid and a new flavanone glycoside - 7-O-methylporiol-4′-β-D-xylopyranosyl-D-glucopyranoside (I) - isolated from heartwood (*Indian J. Chem.* 1971, *9*, 287); aurapten, bergapten, isopimpinellin, 6-methoxy-7-geranyloxycoumarin and marmesin isolated from root bark (*Phytochemistry* 1973, *12*, 236); seed and fruit contained oil (34) and protein (28%); oil composed of palmitic (15.2), oleic (43.4), linoleic (20.4) and linolenic acids (20.6%) besides traces of palmitoleic and stearic acids; β-sitosterol, β-amyrin, lupeol and stigmasterol from unsaponifiable matter of seed oil (*Proc. Nat. Acad. Sci.* India 1976, *46*A, 163; *Chem. Abstr.* 1978, *89*, 126118 a; *J. Am. Oil Chem.* 1979, *56*, 870; *Chem. Abstr.* 1979, *91*, 189771 v); psoralen, bergapten, orientin, vitexin and saponarin isolated from leaves (*Planta Med.* 1979, *36*, 95).

NEW COMPOUNDS



I

FERULA (Apiaceae)

F. assa-foetida L. syn. *F. foetida* Regel (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 117).

Essential oil showed significant protective action against fat- induced increase in plasma fibrinogen and decrease in coagulation time and fibrinolytic activity on alimentary hyper-lipaemia. Serum cholesterol was also slightly lowered (*Indian J. Med. Res.* 1975, *63*, 707).

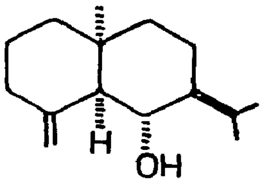
Luteolin and luteolin-7-O-β-D-glucopyranoside from fruits (*Khim. Prir. Soedin.* 1973, *9*, 801; *Chem. Abstr.* 1974, *81*, 166398 h).

F. foetida Regel; see *F. assa-foetida* L.

F. galbaniflua Boiss. & Buhse (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 117).

A new sesquiterpenoid - 10-epijunenol - isolated and its structure elucidated (*Tetrahedron* 1976, *32*, 2261).

NEW COMPOUNDS

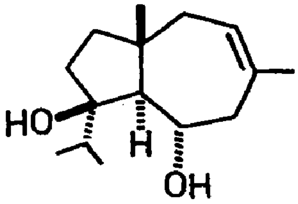


10-Epijunenol

F. jaeschkeana Vatke (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 118).

Structure and stereochemistry of jaeschkeanadiol determined (*Tetrahedron* 1973, *29*, 985).

NEW COMPOUNDS



Jaeschkeanadiol

FESTUCA (Poaceae)

F. rubra L.

New tetrasaccharide containing fructose, glucose and galactose in molar ratio 1:1:2, isolated from seeds (*Acta Chem. Scand.* 1970, *254*, 2149).

Distribution : Himalayas, alt. 1800-4000 m.

FICUS (Moraceae)

F. auriculata Lour. syn. *F. roxburghii* Wall. ex Miq.

H. - Timla, Tirmal; Khasi - Woh-lampin.

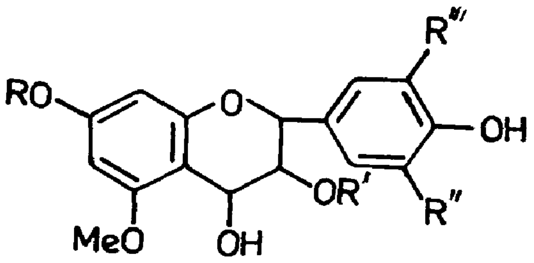
β-Sitosterol, friedelin and epifriedelanol isolated from Egyptian plant (*IUPAC Int. Symp. Chem. Natural Prod.* 2nd 1979, 447; *Chem. Abstr.* 1978, *89*, 189814 m).

Distribution : Himalayas from Punjab to Bhutan upto 1800 m and in Assam, Khasi Hills, Chota Nagpur and Orissa.

F. benghalensis L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 187).

Taraxasterol tiglate from heartwood; quercetin-3-galactoside and rutin isolated from leaves (*Phytochemistry* 1970, *9*, 2583); three new methyl ethers of leucoanthocyanins - delphinidin-3-O-α-L-rhamnoside (I), pelargonidin-3-O-α-L-rhamnoside (II) and leucocyanidin-3-O-β-D-galactosylcellobioside (III) - along with a methyl ether of leucoanthocyanidin isolated from stem bark and characterised (*Indian J. Chem.* 1977, *15B*, 762); 20-tetratriaconten-2-one, pentatriacontan-5-one and 6-heptatriaconten-10-one isolated from stem bark and characterised; β-sitosterol-α-D-glucoside and meso-inositol also isolated (*Pol. J. Pharmacol. Pharm.* 1978, *30*, 559; *Chem. Abstr.* 1979, *90*, 200267 n).

NEW COMPOUNDS



I

R = Me, R' = Rha, R'' = OH, R''' = OMe

II

R = Me, R' = Rha, R'',R''' = H

III

R = H, R' = Glu(4→1)Glu(4→1)Gal, R'' = H, R''' = OMe

F. carica L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 187).

Ethanolic extract of leaves when given orally reduced lactic acid-induced anal ulcers in rats; butanolic extract reduced rat paw oedema caused by carrageenin (*Shoyakugaku Zasshi* 1976, *30*, 62; *Chem. Abstr.* 1977, *87*, 62641 q). Psoralen and bergapten isolated (*Planta Med.* 1974, *26*, 119).

F. glomerata Roxb.; see *F. racemosa* L.

F. palmata Forsk. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 119).

β-Sitosterol and bergapten isolated from leaves (*J. Indian Chem. Soc.* 1976, *53*, 1165).

F. racemosa L. syn. *F. glomerata* Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 188).

A new tetracyclic triterpene - glauanol acetate - isolated from leaves, bark and heartwood and characterised as 13α,14β,17βH,20αH-lanosta-8,22-diene-3β-acetate (*J. Indian Chem. Soc.* 1971, *48*, 1165; *ibid.* 1977, *54*, 1104); two leucoanthocyanins - leucocyanidin-3-O-β-D-glucopyranoside and leucopelargonidin-3-O-α-L-rhamnopyranoside - isolated from stem bark (*Chem. Scr.* 1977, *12*, 37; *Chem. Abstr.* 1979, *90*, 104296 a); β-sitosterol and an unidentified long chain ketone isolated from bark (*J. Indian Chem. Soc.* 1973, *50*, 611, *ibid.* 1977, *54*, 1104); ceryl behenate, lupeol, its acetate, α-amyrin acetate and three unidentified compounds having mp. 134°, 220° and 135° isolated from stem bark (*Proc. Nat. Acad. Sci.* India 1977, *47A*, 1; *Chem. Abstr.* 1978, *89*, 176335 q; *Rocz. Chem.* 1977, *51*, 1265; *Chem. Abstr.* 1977, *87*, 180649 w; *Indian J. Chem.* 1979, *17B*, 87); glauanol isolated from fruits (*Indian J. Chem.* 1979, *17B*, 87).

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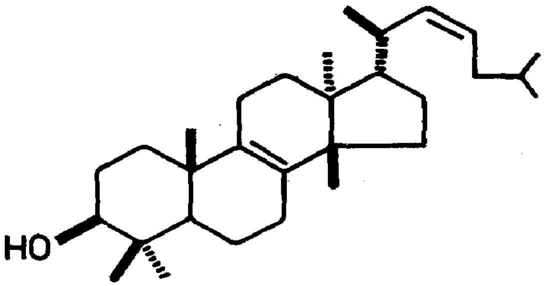


Glauanol

F. roxburghii Wall. ex Miq.; see *F. auriculata* Lour.

F. rumphii Blume (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 119).

β-Sitosterol and 3-hydroxy-3′-methoxyflavone glucoside isolated from bark (*Curr. Sci.* 1979, *48*, 113).

FIRMIANA (Sterculiaceae)

F. colorata (Roxb.) R. Br. syn. *Sterculia colorata* Roxb.

H. - Bodula, Walena, Samarri; B. - Mula; Tel. - Karaka, Karu-boppayi; Tam. - Malambarulti; Kan. - Bilisulige; Mal. - Malam-paratthi; Oriya - Kodalo, Panikodal; Nep. - Sittoudal, Omra, Phirohiri; Lepcha - Kanhleyem; Assam - Jhari, Udal, Kathudal; Bo. - Bhai-koi, Kaushi, Khowsey; Andamans - Berda.

Luteolin-6-O-β-D-glucuronide, luteolin-7-O-glucuronide, and vitexin isolated from leaves; glucuronides of apigenin and scutellarein also isolated but not characterised (*Phytochemistry* 1976, *15*, 839).

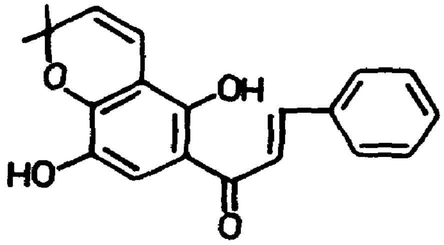
Distribution : Throughout plains of India, occasionally grown in gardens.

FLEMINGIA (Papilionaceae)

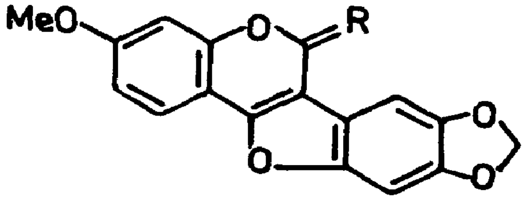
F. chappar Ham. ex Benth. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 120).

Two flavonoids, one of them characterised as 2′,4′-dihydroxychalcone, and β-sitosterol isolated (*J. Indian Chem. Soc.* 1969, *46*, 964); two new chalcones (I and II) isolated (*Tetrahedron Lett.* 1970, 4367); a new coumestan derivative - flemichapparin C, mp. 272° - isolated from roots and characterised as 7-O-methylmedicagol (*Chem. Ind.* 1970, 1113; *Phytochemistry* 1973, *12*, 425); a new chromenochalcone - flemichapparin A - isolated and its structure elucidaated (*J. Indian Chem. Soc.* 1973, *50*, 363); a new pterocarpan - flemichapparin B - isolated from roots and characterised as 6a,11a-dehydropterocarpan (*Phytochemistry* 1973, *12*, 425).

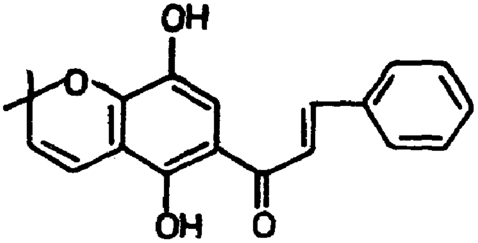
NEW COMPOUNDS



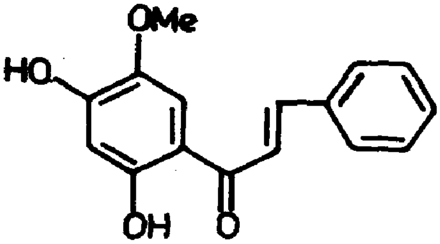
Flemichapparin A



Flemichapparin B
R = H,H
Flemichapparin C
R = O



I



II

F. congesta Ait.; see *F. macrophylla* (Willd.) O. Ktze. ex Merr.

F. congesta Ait. var. *latifolia* (Roxb.) Baker; see *F. macrophylla* (Willd.) O. Ktze. ex Merr.

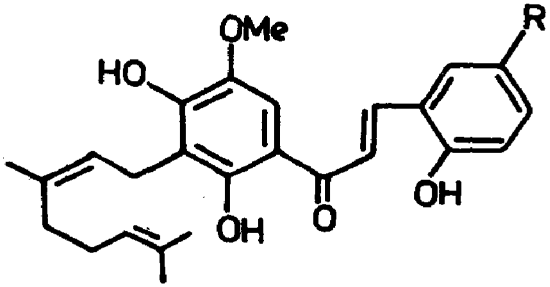
F. congesta Ait. var. *semialata* (Roxb.) Baker; see *F. macrophylla* (Willd.) O. Ktze. ex Merr

F. congesta Ait. var. *wightiana* (W. & A.) Baker; see *F. macrophylla* (Willd.) O. Ktze. ex Merr.

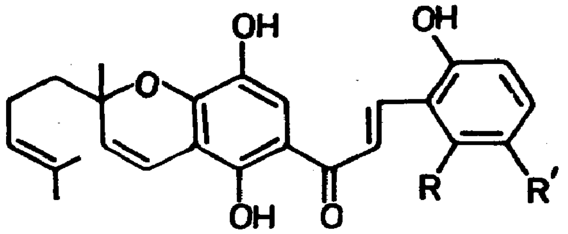
F. grahamiana W. & A. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 120).

Flemingins A, B and C, homoflemingin and desoxy-homoflemingin isolated (*Phytochemistry* 1973, *12*, 2027).

NEW COMPOUNDS



Desoxy-homoflemingin
R = H
Homoflemingin
R = OH

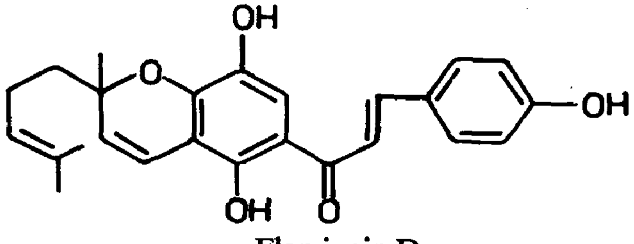


Flemingin A
R,R' = H
Flemingin B
R = OH, R' = H
Flemingin C
R = H, R' = OH

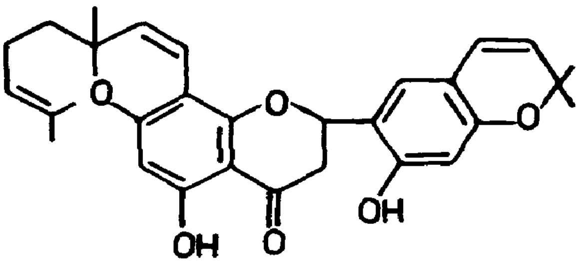
F. macrophylla (Willd.) O. Ktze. ex Merr. syn. *F. congesta* Ait. *F. congesta* Ait. var. *latifolia* (Roxb.) Baker, *F. congesta* Ait. var. *semialata* (Roxb.) Baker, *F. congesta* Ait. var. *wightiana* (W. & A.) Baker, *F. stricta* Roxb., *F. wallichii* W. & A., *F. rhodocarpa* Baker, *Moghania* (*Maughania*) *macrophylla* (Willd.) O. Ktze. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 120).

Red pigments - flemingins A,B and C and homoflemingin - isolated from seed pod (*Tetrahedron* 1968, *24*, 497; *Corsi Semin. Chim.* 1968, *11*, 97; *Chem. Abstr.* 1970, *72*, 21564 p); new chromenochalcone - flemingin D - characterised as 2-methyl-2-(4'-methylpent-3'-enyl)-5,8-dihydroxy-6-(4-hydroxycinnamoyl)chromene isolated together with flemingin C and two other chalcones (*Phytochemistry* 1973, *12*, 2027); a new chromenoflavanone - flemichin A - isolated from roots and characterised (*Indian J. Chem.* 1974, *12*, 762); other chromeno-flavanones - flemichins B, C and D - isolated from roots and characterised (*Indian J, Chem.* 1975, *13*, 775); vicenin-2, reynoutrin, rutin, myricitrin and robinin isolated from leaves (*Shoyakugaku Zasshi* 1977, *31*, 172; *Chem. Abstr.* 1978, *88*, 148947 b); 5,7,2',4'-tetrahydroxyisoflavone, mp. 270°, isolated from wood; lupeol, α-amyrin, sitosterol and its glucoside from bark and wood; procyanidin detected in bark (*Phytochemistry* 1977, *16*, 1120); two isomeric chalcones - homoflemingin and flemiwallichin C - isolated from leaves and their structures elucidated (*Curr. Sci.* 1978, *47*, 584); synthesis of flemichin B (*Chem. Lett.* 1978, 995; *Chem. Abstr.* 1979, *90*, 22854 s); isolation of three new flavanones - flemiflavanones A, B and C - from roots and elucidation of their structures (*Indian J. Chem.* 1979, *17*B, 85).

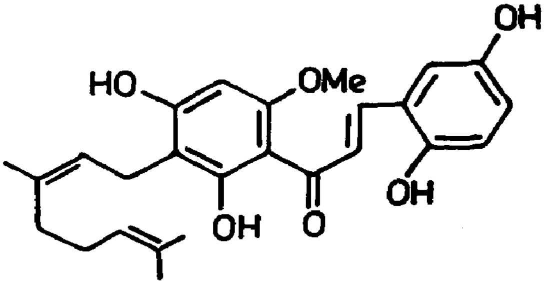
NEW COMPOUNDS



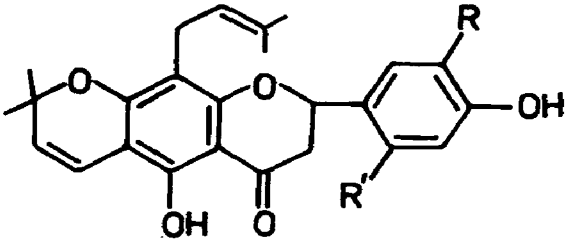
Flemingin D



Flemichin A



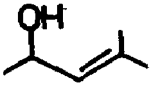
Flemiwallichin C



Flemichin B

R,R' = H

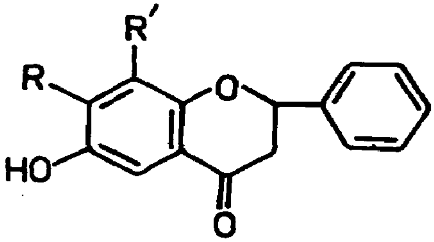
Flemichin C

R = 

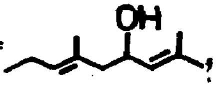
, R' = OH

Flemichin D

R = H, R' = OH



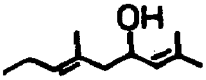
Flemiflavanone B

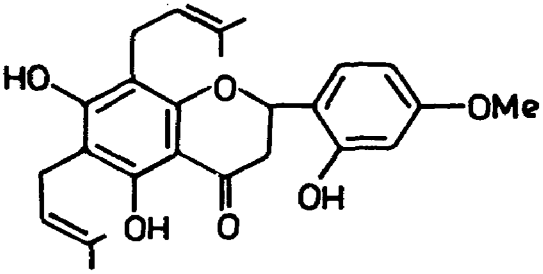
R = 

, R' = OH

Flemiflavanone C

R = OH,

R' = 



Flemiflavanone A

F. rhodocarpa Baker; see *F. macrophylla* (Willd.) O. Ktze. ex Merr.

F. stricata Roxb.; see *F. macrophylla* (Willd.) O. Ktze. ex Merr.

F. strobilifera (L.) R. Br. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 120).

Quercitrin, rutin and quercimeritrin obtained from leaves, stems and flowers (*Indian J. Chem.* 1976, *14*B, 230).

F. wallichii W. & A.; see *F. macrophylla* (Willd.) O. Ktze. ex Merr.

FLUEGGEA (Euphorbiaceae)

F. microcarpa Blume; see *Securinega virosa* (Roxb. ex Willd.) Baillon

F. virosa (Roxb. ex Willd.) Baillon; see *Securinega virosa* (Roxb. ex Willd.) Baillon

FOENICULUM (Apiaceae)

F. vulgare Mill. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 188).

Seeds yielded essential oil (2.0-2.5%); α-pinene (3.0), camphene (0.65), α-phellandrene (0.44), limonene (4.56), fenchone (10.20), methylchavicol (3.50), anethole (74.85), anisaldehyde (1.80) and p-anisic acid (1.0%) found in oil by GLC (*Pakistan J. Sci. Ind. Res.* 1975, *18*, 236; *Chem. Abstr.* 1977, *87*, 28848 c); seeds shown to contain long chain (C_{20} to C_{30}) esters of arachidic acid (*Indian J. Chem.* 1977, *15B*, 583).

FORSYTHIA (Oleaceae)

F. viridissima Lindl.

Arctiin, arctigenin, matairesinoside and matairesinol from fruits (*Phytochemistry* 1972, *11*, 1522; *Shoyakugaku Zasshi* 1978, *32*, 194; *Chem. Abstr.* 1979, *90*, 109843 m); isoquercitrin and astragalin isolated (*Phytochemistry* 1972, *11*, 1522); a new iridoid glucoside - forsythid - and its methyl ester isolated and characterised (*Chem. Pharm. Bull.* 1973, *21*, 497); betulinic, ursolic and oleanolic acids and rutin isolated from fruits (*Shoyakugaku Zasshi* 1978, *32*, 194; *Chem. Abstr.* 1979, *90*, 109843 m).

Distribution : South-east Europe and east Asia, introduced into India as hedge plant in gardens of hill stations.

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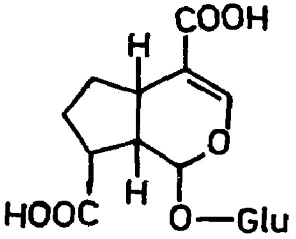

Forsythid

FORTUNELLA (Rutaceae)

F. japonica (Thunb.) Swingle syn. *Citrus japonica* Thunb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 188)

Nobiletin, tangeretin, 3',4',5,7,8-pentamethoxyflavone and sitosterol isolated (*Phytochemistry* 1975, *14*, 309).

FRAXINUS (Oleaceae)

F. griffithii Clarke

Iridoid glycoside - ligstroside - syringin and sinapaldehyde glucoside obtained from bark (*Phytochemistry* 1978, *17*, 564).

Distribution : Mishmi Hills in Arunachal Pradesh.

FRITILLARIA (Liliaceae)

F. imperialis L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 121).

Plant extract caused marked contraction of isolated rat phrenic nerve diaphragm preparation. It antagonised blockade of neuromuscular transmission and prevented depolarisation induced by excess K^+ (*C. R. Soc. Biol.* 1969, *163*, 2117; *Chem. Abstr.* 1970, *73*, 23681 u).

Imperialine and alkaloids - cevanin, mp. 272°, cevacin, mp. 178°, and a compound mp. 145° - isolated (*Indian J. Chem.* 1969, *7*, 1057); crystal structure of imperialine (*Tetrahedron Lett.* 1976, 3161; *Chem. Zvesti* 1978, *32*, 116; *Chem. Abstr.* 1978, *89*, 20324 z); verticine isolated from bulbs (*Chem. Zvesti* 1978, *32*, 116; *Chem. Abstr.* 1978, *89*, 20324 z).

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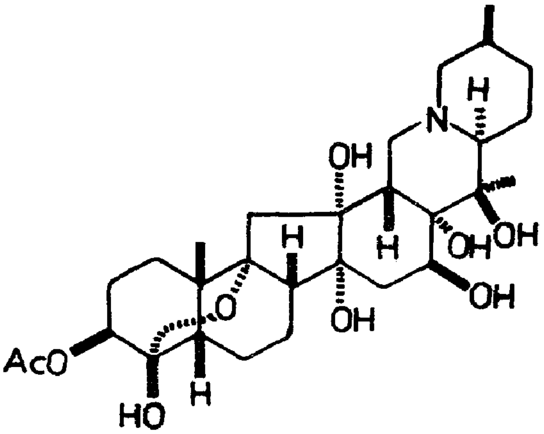
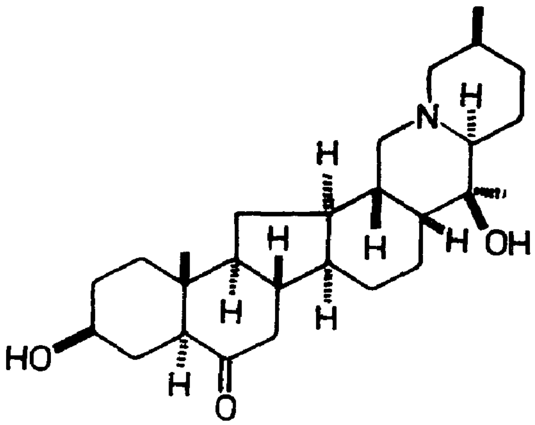


Cevanin



Imperialine

BIOLOGICAL ACTIVITY

A new alkaloid isolated from plant produced increase in maximal contraction of muscle in response to adrenaline and reversed nonexcitability state of muscle (*Therapie* 1969, *24*, 1133; *Chem. Abstr.* 1970, *72*, 41340 r).

F. roylei Hook. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 121).

An alkaloid - kashmirine - isolated and its crystal structure determined and found identical with that of imperialine (*Tetrahedron Lett.* 1976, 2903).

FUMARIA (Fumariaceae)

F. indica (Hassk.) Pugsley (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 122).

19-Methyloctacosan-1-ol, 3-methyloctacosan-1,3-diol, C_{27-29} n-alkanes, β-sitosterol, stigmasterol and campesterol isolated (*J. Indian Chem. Soc.* 1973, *50*, 230); (-)tetrahydrocoptisine and protopine isolated from seeds (*Curr. Sci.* 1974, *43*, 748); in addition, (+)-, (±)bicuculline and (±)tetrahydrocoptisine isolated (*J. Inst. Chemists*, Calcutta 1974, *46*, 120; *Chem. Abstr.* 1975, *82*, 171263 k); a phenolic protoberberine alkaloid - dehydrocheilanthifoline - isolated together with coptisine (*Phytochemistry* 1976, *15*, 545).

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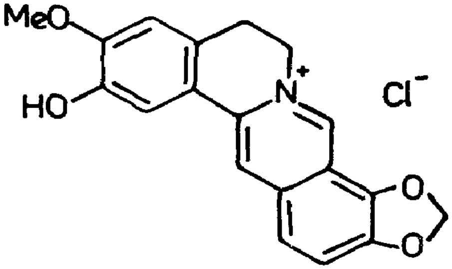

Dehydrocheilanthifoline

F. officinalis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 189).

Plant extract showed choleretic activity in normal as well as hypocholeretic rats and cholekinetic activity in pigs as shown by contraction of isolated bile duct and relaxation of Oddi's sphincter. It inhibited contraction of Oddi's sphincter induced by morphine unlike protopine which showed contractile activity on Oddi's sphincter (*Oyo Yakuri* 1972, *6*, 501; *Chem. Abstr.* 1973, *78*, 66946 e); total alkaloids had LD50 or 55 mg/kg, i.v. in mice. At 1-1.5 mg/kg, i.v. it slowed heart rate in rabbits by 14-22% without prolonging PQ and QT intervals. At 5 mg/kg, i.v., it prevented fibrillation in mice treated with lethal dose of calcium chloride and saved 50% of animals. At 0.5 mg/kg, i.v., it prevented adrenalin arrhythmia in 50% of rabbits. Its antiarrhythmic activity was equal to that of ethmozine (*Khim. Farm. Zh.* 1977, *11*, 56; *Chem. Abstr.* 1977, *87*, 48139 a).

Structure of fumarofine assigned as 1,2,3,4-tetrahydro-4′,5-methylenedioxy-6,7,1′-trihydroxy-2-methylspiro-[isoquinoline-1,2′-indan]-3′-one (*Can. J. Chem.* 1971, *49*, 3020); structure of fumarophycine isolated from Bulgarian plant (*Can. J. Chem.* 1971, *49*, 139); rutoside, quercetin-3-glucoside, chlorogenic and caffeic acids isolated (*Trav. Soc. Pharm. Montpellier* 1971, *31*, 233; *Chem. Abstr.* 1972, *76*, 83557 e); isoquercitrin, quercetin-3,7-diglucoside, quercetin-3-arabinoglucoside, rutin and a kaempferol arabinoside isolated (*Ann. Pharm. Fr.* 1971, *29*, 591; *Chem. Abstr.* 1972, *76*, 151047 r); l-hexacosanol isolated (*Trav. Soc. Pharm. Montpellier* 1972, *32*, 287; *Chem. Abstr.* 1973, *78*, 69240 f); plant contained total alkaloids 0.87-1.27%; protopine (0.18-0.25), fumoficinaline (0.16-0.2%) and cryptopine were

the major alkaloids (*Tr. Permsk. Gos. Med. Inst.* 1973, *118*, 33; *Chem. Abstr.* 1975, *83*, 128664 a; *Acta Pharm. Suec.* 1973, *10*, 520; *Chem. Abstr.* 1974, *80*, 80087 y); fumaritine (1.0%) isolated (*Khim. Farm. Zh.* 1974, *8*, 32; *Chem. Abstr.* 1975, *82*, 83010 v); presence of citric, fumaric, malic, succinic, gly^olic and lactic acids shown by chromatography (*Trav. Soc. Pharm. Montpellier* 1974, *34*, 109; *Chem. Abstr.* 1975, *82*, 13945 e); isolation of sanguinarine and α-naphthophenanthrene from roots and aerial parts (*Aktual. Vopr. Farm.* 1975, *2*, 15; *Chem. Abstr.* 1976, *84*, 118428 h).

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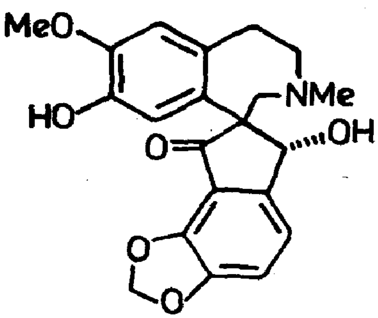
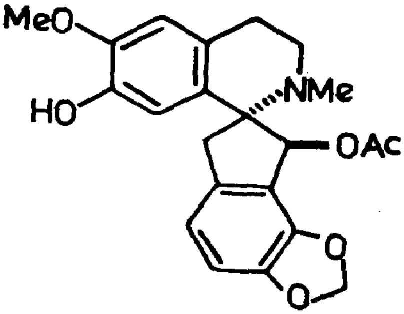


Fumarofine



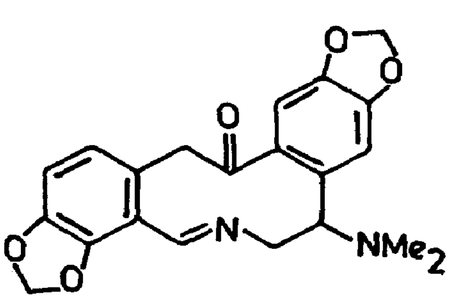
Fumarophycine

F. parviflora ssp. *vaillantii* (Loisel.) Hook.f.; see *F. vaillantii* Loisel.

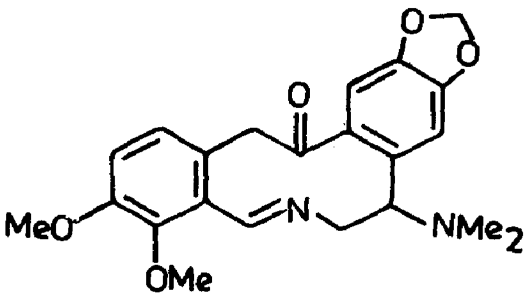
F. parviflora Lamk. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 190).

Isolation and structure of parfumine, mp. 111° (*Dokl. Acad. Nauk SSSR* 1969, *189*, 1262; *Chem. Abstr.* 1970, *73*, 66767 u; *Folia Med.* 1974, *16*, 101; *Chem. Abstr.* 1976, *85*, 43724 m); isolation and structure of parfumidin (*Khim. Prir. Soedin.* 1970, *6*, 493; *Chem. Abstr.* 1971, *74*, 28827 b; *Folia Med.* 1974, *16*, 101; *Chem. Abstr.* 1976, *85*, 43724 m); fumaridine and fumaramine isolated and characterised (*Khim. Prir. Soedin.* 1970, *6*, 588; *Chem. Abstr.* 1971, *74*, 42528 m); protopine, cryptopine and d-bicuculline isolated (*Folia Med.* 1974, *16*, 101; *Chem. Abstr.* 1976, *85*, 43724 m).

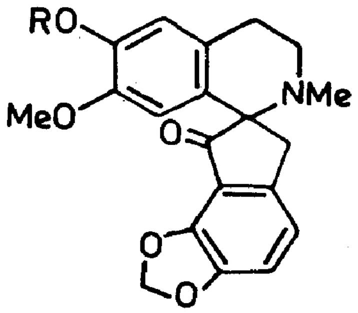
NEW COMPOUNDS



Fumaramine



Fumaridine



Parfumine
R = H
Parfumidin
R = Me

BIOLOGICAL ACTIVITY

Bicuculline induced electroencephalographic pattern in rats and rabbits consisting of spiking and terminating in grand mal seizures (*Physiol. Behav.* 1972, *9*, 283; *Chem. Abstr.* 1973, *78*, 67126 z); at 0.25-1.0 mg/kg, i.v., it suppressed presynaptic inhibition of quadriceps, posterior biceps, semitendinosus and gastrocnemius-soleus monosynaptic action potential in midcollicular decerebrate cats, but had no effect on direct inhibition of these potentials (*Neuropharmacology* 1972, *11*, 789).

LD50 values of fumaridine and fumaramine in mice were 60 and 52 mg/kg, i.v., respectively. Fumaridine (5-10 mg/kg) or fumaramine (10-20 mg/kg) showed transient hypotensive and antiarrhythmic effects (*Med. Zh. Uzb.* 1973, 33; *Chem. Abstr.* 1974, *80*, 103986 g).

F. parviflora Lamk. ssp. *vaillantii* Loisel.; see *F. vaillantii* Loisel.

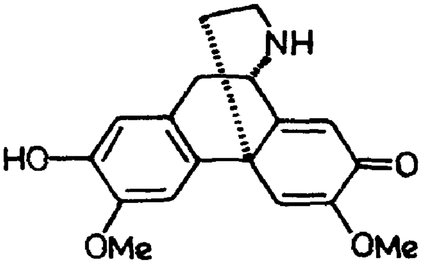
F. vaillantii Loisel. syn. *F. parviflora* Lamk. ssp. *vaillanti* (Loisel.) Hook.[f].

Aqueous and alcoholic extracts administered i.p. into rats reduced muscular activity, produced ataxia and loss of muscle tone (*Quart. J. Crude Drug Res.* 1977, *15*, 25; *Chem. Abstr.* 1978, *88*, 32105 w).

Fumaridine and fumaramine isolated and characterised (*Khim. Prir. Soedin.* 1970, *6*, 588; *Chem. Abstr.* 1971, *74*, 42528 m; *Khim. Prir. Soedin.* 1974, *10*, 476; *Chem. Abstr.* 1975, *82*, 28586 n); a new alkaloid - vaillantine (2,3-didemethylmuramine) - isolated along with d-α-hydrastine, l-adlumine, l-adlumidine and d-bicuculline (*Khim. Prir. Soedin.* 1974, *10*, 476; *Chem. Abstr.* 1975, *82*, 28586 n); protopine, stylopine, cryptopine and synactine isolated; total alkaloid content 0.21% in dry plant (*Farmacia* 1979, *27*, 1; *Chem. Abstr.* 1979, *91*, 2538 j); a new morphinandienone alkaloid - norpallidine - isolated from roots and its structure elucidated (*Phytochemistry* 1976, *15*, 1802); detection of β-sitosterol, choline and protopine by physical analysis (*Quart. J. Crude Drug Res.* 1977, *15*, 25; *Chem. Abstr.* 1978, *88*, 32105 w).

Distribution : Gangetic plains, lower Himalayas and Nilgiri Hills, ascending to 1500 m.

NEW COMPOUNDS



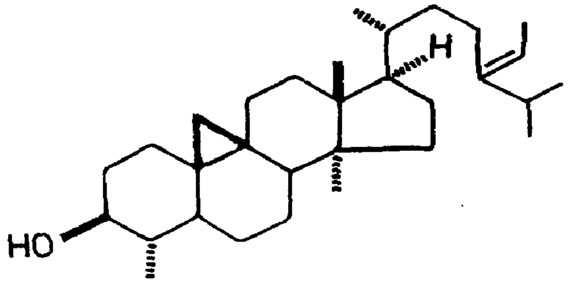
Norpallidine

FUNTUMIA (Apocynaceae)

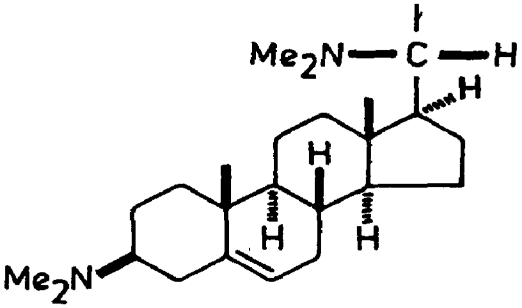
F. elastica Stapf (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 190).

Cyclofuntumienol isolated from bark and leaves and its structure assigned as (Z)28-methyl-cycloeucalenol (*Tetrahedron Lett.* 1973, 2779); 20-epiirehdiamine, conamine, conessine and N,N′-tetramethylholarrhimine isolated from seeds (*Planta Med.* 1979, *35*, 48).

NEW COMPOUNDS



Cyclofuntumienol



20-Epiirehdiamine

FURCRAEA (Agavaceae)

F. elegans Tod.

Hecogenin and tigogenin present in leaves, buds and flowers (*Indian J. Chem.* 1977, *15*B, 582).

Distribution : Native of tropical America, grown in Indian gardens and elsewhere.

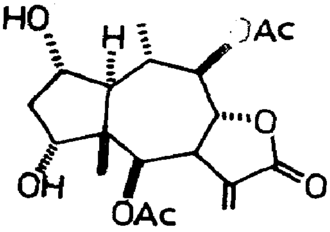
GAILLARDIA (Asteraceae)

G. aristata Pursh (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 191).

Pulchellins C and E isolated (*Phytochemistry* 1973, *12*, 2541); seven flavonoids including vitexin, orientin and quercetin glucoside isolated (*Rocz. Chem.* 1974, *48*, 1111; *Chem. Abstr.* 1975, *82*, 13985 t); stereostructure of spathulin established (*Phytochemistry* 1974, *13*, 1171);

swertisin, isoquercitrin, 6C-gluco-arabinoglucosyl-5,3′,4′-trihydroxy-7-methoxyflavone, apigenin and luteolin isolated (*Rocz. Chem.* 1977, *51*, 921; *Chem. Abstr.* 1977, *87*, 180645 s).

NEW COMPOUNDS

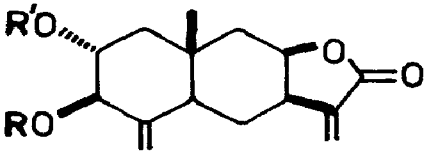


Spathulin

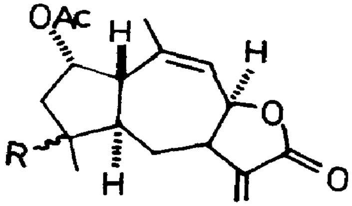
G. pulchella Fouger. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 191).

Structure of pulchellins B,C,D,E and F revised (*J. Org. Chem.* 1970, *35*, 627); pseudoguaianolides - pulchellin and its isomer neopulchellin - isolated, stereostructures of pulchellin and pulchellidine assigned (*Tetrahedron Lett.* 1970, 131, 135); 22β-hydroxyfriedel-1-ene and 1β,22β-dihydroxyfriedelin isolated from bark (*Phytochemistry* 1972, *11*, 851); pulchellin, neopulchellin and guaianolides - gaillardin, neogaillardin - and an unidentified base isolated (*Phytochemistry* 1973, *12*, 1741); stereostructure of spathulin (*Phytochemistry* 1974, *13*, 1171); a novel compound - pulchellon - isolated and its structure established (*Chem. Pharm. Bull.* 1975, *23*, 2998).

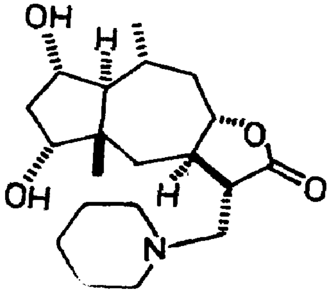
NEW COMPOUNDS



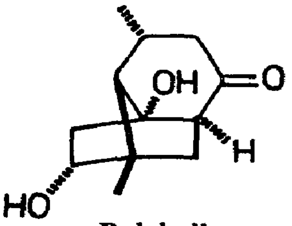
Pulchellin B
R = H, R′ = Ac
Pulchellin C
R,R′ = H
Pulchellin F
R = H, R′ = Angeloyl
Pulchellin E
R = Ac, R′ = H



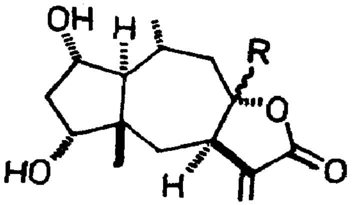
Gaillardin
R = β-OH
Neogaillardin
R = α-OH



Pulchellidine



Pulchellon



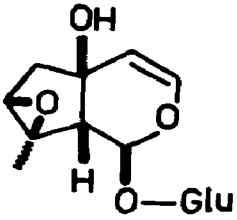
Pulchellin
R = β-H
Neopulchellin
R = α-H

GALEOPSIS (Lamiaceae)

G. tetrahit (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 122).

A new iridoid glucoside - galiridoside - isolated and its structure elucidated (*Tetrahedron Lett.* 1970, 3197).

NEW COMPOUNDS



Galiridoside

GALINSOGA (Asteraceae)

G. parviflora Cav.

Luteolin-7-O-β-D-glucopyranoside and apigenin-7-O-β-D-glucoside isolated (*Khim. Prir. Soedin.* 1977, *13*, 682; *Chem. Abstr.* 1978, *88*, 121655 t).

Distribution : Native of tropical America, naturalised in India. Himalayas upto 2500 m.

GALIUM (Rubiaceae)

G. aparine L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 192).

Luteolin isolated from plant (*Indian J. Chem.* 1976, *14*, 475).

G. verum L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 122).

Palustroside, rutin, asperuloside and chlorogenic acid isolated (*Khim. Prir. Soedin.* 1971, *7*, 529; *Chem. Abstr.* 1971, *75*, 148542 x); 3-glucosylquercetin, 7-glucosylquercetin, 3-rutinosylquercetin, 3,7-diglucosylquercetin and 7-glucosylluteolin obtained from plant (*C. R. Acad. Sci.* Ser. D 1972, *274*, 1746; *Chem. Abstr.* 1972, *77*, 16594 x); phloretic acid (p-hydroxy-phenylpropionic acid) isolated (*Pol. J. Pharmacol. Pharm.* 1973, *25*, 465; *Chem. Abstr.* 1974, *80*, 45660 h); highest total flavonoid content in plant 2.19% (*Rastit. Resur.* 1975, *11*, 351; *Chem. Abstr.* 1975, *83*, 190343 y).

GARCINIA (Clusiaceae)

G. cowa Roxb. ex DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 122).

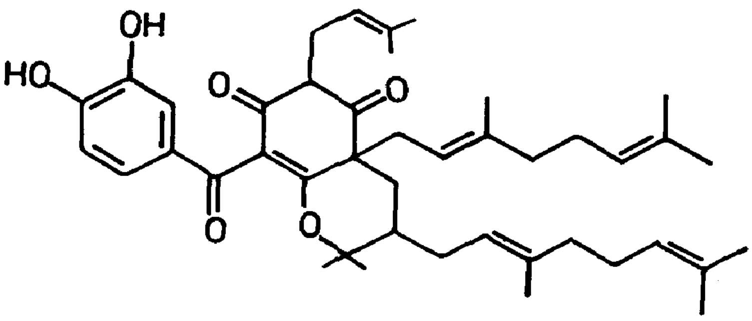
1,3,6-Trihydroxy-7-methoxy-8-(3,7-dimethyl-2,6-octadienyl)-xanthone isolated from stems (*Phytochemistry* 1977, *16*, 2038).

G. hombroniana Pierre

Structure of bronianone revised (*Tetrahedron Lett.* 1973, 4981).

Distribution : Andaman and Nicobar Islands.

NEW COMPOUNDS

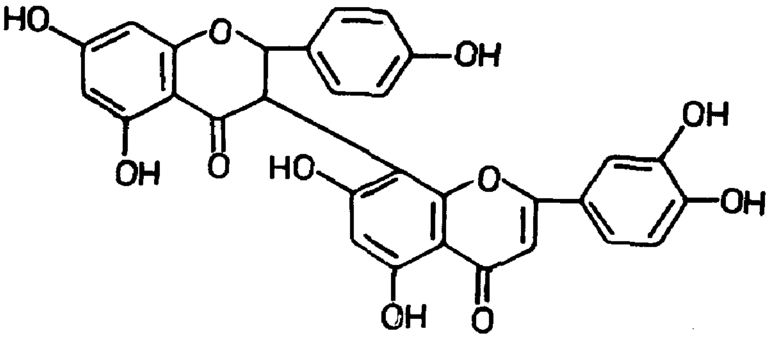


Bronianone

G. indica (Dupetit-Thouars) Chois. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 122).

L-Leucine isolated from leaves (*J. Indian Chem. Soc.* 1972, *49*, 583); euxanthone and biflavonoids - volkensiflavone and morelloflavone - isolated from heartwood (*Phytochemistry* 1977, *16*, 148).

NEW COMPOUNDS



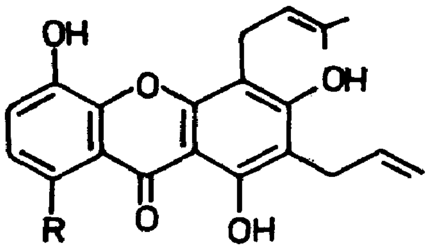
Morelloflavone

G. kola Heckel; see *Cola acuminata* (Beauv.) Schott. & Endl.

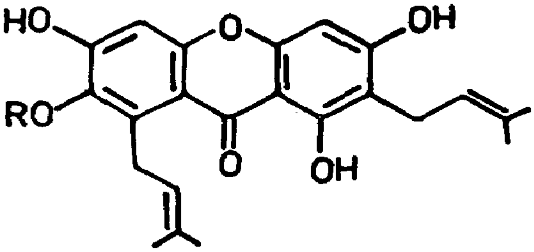
G. mangostana L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 192).

Three new xanthones - gartanin, 8-deoxygartanin and normangostin - isolated from fruits (*Indian J. Chem.* 1971, *9*, 505; *Tetrahedron* 1971, *27*, 3919); mangostin isolated and its structure confirmed (*Planta Med.* 1973, *24*, 297); 1,3,6,7-tetrahydroxyxanthone and its glucoside isolated from heartwood (*Phytochemistry* 1975, *14*, 2517); cyanidin-3-sophoroside and cyanidin-3-glucoside from rinds (*J. Food Sci.* 1977, *42*, 1667; *Chem. Abstr.* 1977, *87*, 180740 u).

NEW COMPOUNDS



Gartanin
R = OH
8-Deoxygartanin
R = H

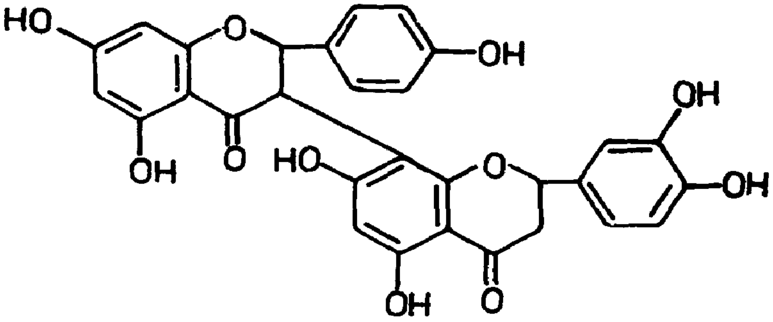


Mangostin
R = Me
Normangostin
R = H

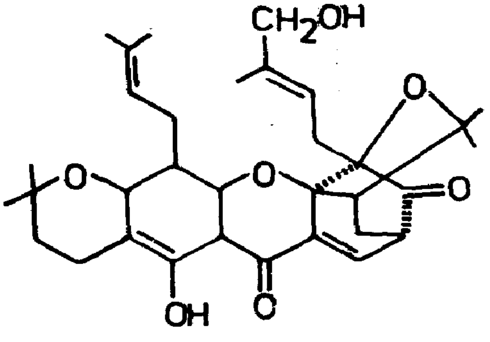
G. morella (Gaertn.) Desr. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 123).

Morellinol, dihydromorelloflavone and morelloflavone-7''-β-glucoside isolated (*Indian J. Chem.* 1976, *14*B, 19); a pigment - moreollin - isolated from seed coat and its structure determined (*Proc. Indian Acad. Sci.* 1978, *87*A, 75; *Chem. Abstr.* 1978, *89*, 110047 r).

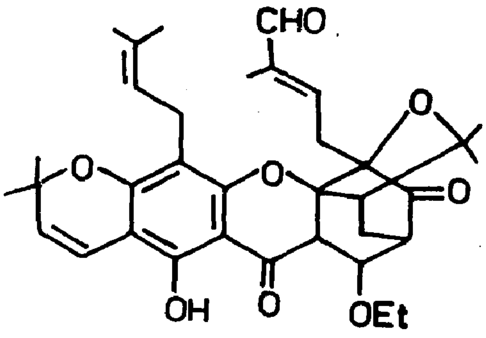
NEW COMPOUNDS



Dihydromorelloflavone



Morellinol



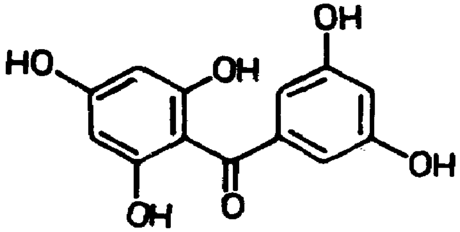
Moreollin

G. ovalifolius Hook.f. var. *macrantha* T. Anders.; see *G. talbotii* Raizada ex Sant.

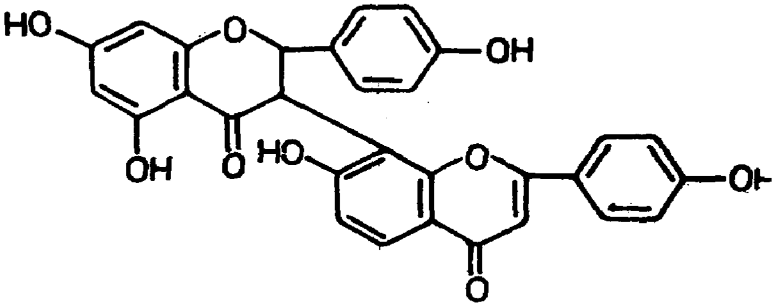
G. pedunculata Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 123).

A new compound - 2,4,6,3′,5′-pentahydroxybenzophenone (I) - isolated from heartwood along with 1,3,5,7-tetrahydroxyxanthone, 1,3,6,7-tetrahydroxyxanthone, biflavanone GB-la and talbotaflavanone (volkensiflavone) (*Phytochemistry* 1974, *13*, 1241).

NEW COMPOUNDS



I



Talbotaflavone

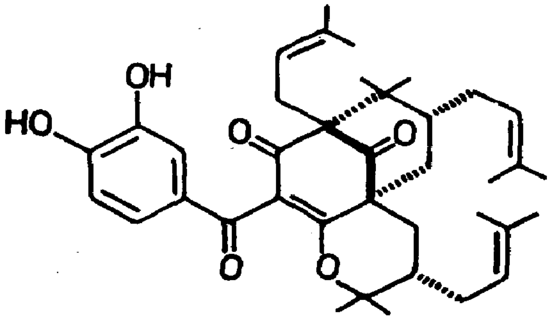
G. talbotii Raizada ex Sant. syn. *G. ovalifolius* Hook.f. var. *macrantha* T. Anders.

Talbotaflavone and morelloflavone isolated from roots and characterised (*Phytochemistry* 1970, *9*, 881).

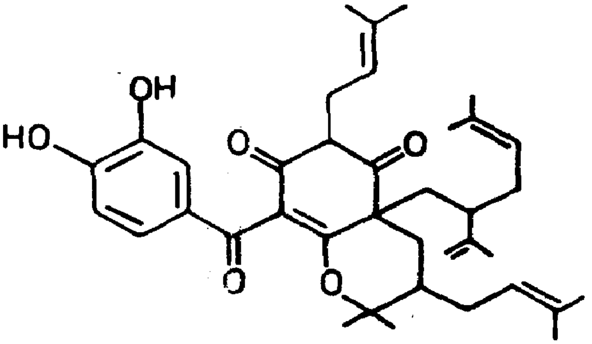
G. xanthochymus Hook.f. & T. Anders. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 123).

Xanthochymol and isoxanthochymol isolated from fruits and their structures elucidated (*Tetrahedron Lett.* 1973, 4997; *Curr. Sci.* 1979, *48*, 814); revision of structure of isoxanthochymol and cambogin (*Chem. Ind.* 1979, 92); volkensiflavone, morelloflavone, biflavones GB-1 and GB-la, maclurin, 1,5-dihydroxyxanthone and 1,7-dihydroxyxanthone isolated from fruits (*Curr. Sci.* 1979, *48*, 814)).

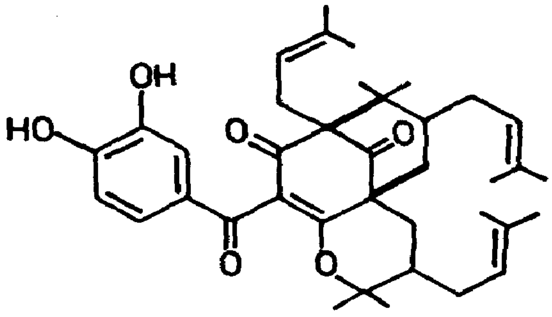
NEW COMPOUNDS



Cambogin



Xanthochymol



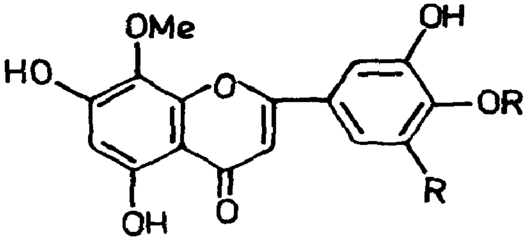
Isoxanthochymol

GARDENIA (Rubiaceae)

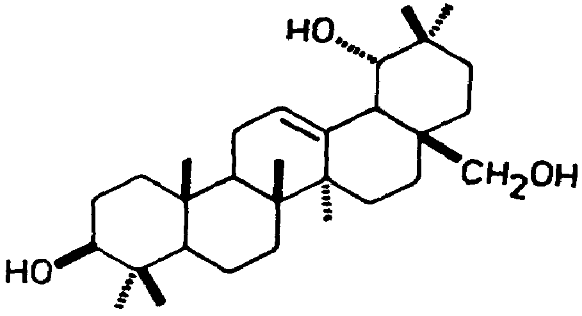
G. gummifera L.f. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 123).

Oleanonic aldehyde, sitosterol, D-mannitol, erythrodiol and a new compound - 19α-hydroxyerythrodiol - isolated from stem bark and characterised (*Planta Med.* 1970, *32*, 206); gardenin and 5-demethyltangeretin, mp. 170°, isolated from gum (*J. Res. Indian Med.* 1973, *8*, 38); two new flavones - 3′,4′-dihydroxywogonin and 3′,4′,5′-trihydroxywogonin - isolated from gum in addition to isoscutellarein, 4′-hydroxywogonin, apigenin and demethoxysudachitin and characterised (*Indian J. Chem.* 1976, *14*B, 651); another flavone isolated from gum and characterised as 3′,5′-dihydroxy-4′-methoxywogonin (*Phytochemistry* 1977, *16*, 1109).

NEW COMPOUNDS



3′,4′-Dihydroxywogonin
R,R′ = H
3′,4′,5′-Trihydroxywogonin
R = OH, R′ = H
3′,5′-Dihydroxy-4′-methoxywogonin
R = OH, R′ = Me



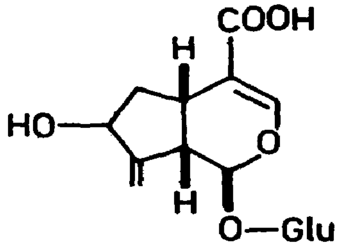
19α-Hydroxyerythrodiol

G. jasminoides Ellis (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 193).

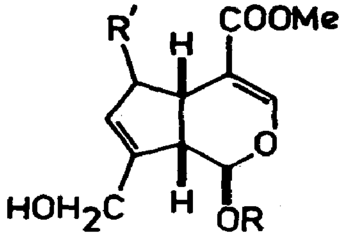
A new iridoid glycoside - genipin-1-β-D-gentiobioside - isolated from fruits (*Chem. Pharm. Bull.* 1970, *18*, 1066; *ibid.* 1973, *21*, 2684); geniposide isolated (*Chem. Pharm. Bull.* 1973, *21*,

2684); two other iridoids - gardoside and scandoside methyl ester - isolated from fruits (*Phytochemistry* 1974, *13*, 2219).

NEW COMPOUNDS



Gardoside



Genipin-1-β-D-gentiobioside
R = gentiobiose, R' = H
Scandoside methyl ester
R = Glu, R' = β-OH

BIOLOGICAL ACTIVITY

Geniposide induced prolonged choleretic action after intraduodenal administration to rats; genipin, the aglycone of geniposide, had more rapid effect and was active at lower concentration (*J. Pharmacobio- Dyn.* 1978, *1*, 81; *Chem. Abstr.* 1978, *89*, 208861 b).

G. lucida Roxb.; see *G. resinifera* Roth

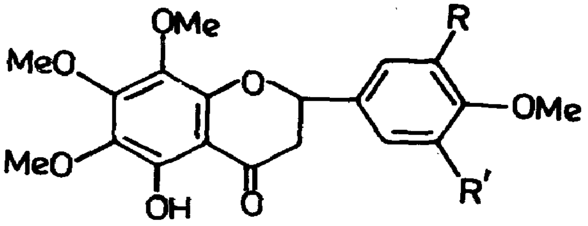
G. resinifera Roth syn. *G. lucida* Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 193).

A new flavone isolated from gum and characterised as 3',5'-dihydroxy-4'-methoxywogonin (*Phytochemistry* 1977, *16*, 1109).

G. turgida Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 123).

D-Mannitol, its hexaacetate, its hexabenzoate, gardenin A, mp. 163°, gardenin B, mp. 177°, gardenin E, mp. 230°, oleanolic acid, α-amyrin and β-sitosterol isolated from roots (*J. Indian Chem. Soc.* 1979, *56*, 327).

NEW COMPOUNDS



Gardenin B
R,R' = H
Gardenin E
R,R' = OH

GARUGA (Burseraceae)

G. pinna.. Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 123).

Amentoflavone isolated from leaves (*Indian J. Chem*. 1978, *16*B, 846).

GAULTHERIA (Ericaceae)

G. fragrantissima Wall. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 124).

β-Sitosterol, quercetin-3-galactoside and ursolic acid isolated from leaves (*Indian J. Pharm.* 1972, *34*, 125).

GELONIUM (Euphorbiaceae)

G. bifarium Roxb.; see *Suregada bifaria* Roxb.

GENDARUSSA (Acanthaceae)

G. vulgaris Nees syn. *Justicia gendarussa* Burm. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 146).

β-Sitosterol and two unidentified alkaloids isolated from leaves (*J. Res. Indian Med.* 1974, *9*, 64).

GENTIANA (Gentianaceae)

G. argentia (D. Don) Clarke

Luteolin, isoorientin, isovitexin and O-glycosides of apigenin and luteolin isolated and characterised (*Plant. Med. Phytother.* 1977, *11*, 112; *Chem. Abstr.* 1977, *87*, 114686 e).

Distribution : Kashmir, Himachal Pradesh, alt. 2400-4200 m.

G. chirayita Roxb.; see *Swertia chirayita* (Roxb. ex Flem.) Kars.

G. dahurica Fisch.; see *G. olivieri* Griseb.

G. depressa D. Don

Luteolin, isoorientin, isovitexin and O-glycosides of apigenin and luteolin isolated (*Plant. Med. Phytother.* 1977, *11*, 112; *Chem. Abstr.* 1977, *87*, 114686 e).

Distribution : Nepal and Sikkim.

G. elwesii Clarke

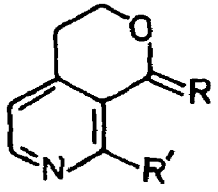
Luteolin, isoorientin, isovitexin and O-glycosides of apigenin and luteolin isolated (*Plant. Med. Phytother.* 1977, *11*, 112; *Chem. Abstr.* 1977, *87*, 114686 e).

Distribution : Sikkim Himalayas, alt. 3600-4500 m.

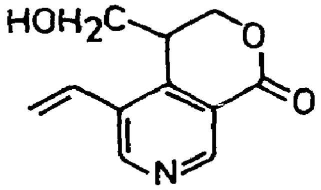
G. olivieri Griseb. syn. *G. dahurica* Fisch. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1956, p. 194).

Gentianine, gentianamine, gentianadine, gentioflavine, oliverine, mp. 206° and oliveridine, mp. 260°, isolated from aerial parts; oliveridine identified as methoxy derivative of oliverine (*Khim. Prir. Soedin.* 1969, *5*, 608; *Chem. Abstr.* 1970, *73*, 84624 z; *Khim. Prir. Soedin.* 1972, *8*, 350; *Chem. Abstr.* 1972, *77*, 162012 x); gentiatibetine isolated (*Khim. Prir. Soedin.* 1972, *8*, 350; *Chem. Abstr.* 1972, *77*, 162012 x); gentioflavine, gentianamine and oliveramine isolated (*Khim. Prir. Soedin.* 1973, *9*, 64; *Chem. Abstr.* 1973, *78*, 159956 y).

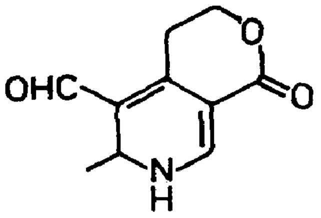
NEW COMPOUNDS



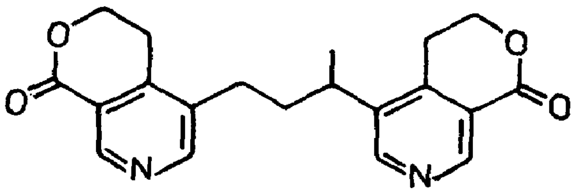
Gentianadine
R = O, R' = H
Gentiatibetine
R = OH,H, R' = Me
Oliveridine
R = OMe,H, R' = Me



Gentianamine



Gentioflavine



Oliveramine

G. ornata Clarke; see *G. prolata* Balf.f.

G. pedicellata (D. Don) Wall. ex Griseb. syn. *G. quadrifaria* sensu Clarke p.p., *G. quadrifaria* var. *pilosula* Clarke, *G. squarrosa* sensu Clarke, p.p.

Luteolin, isoorientin, isovitexin and O-glycosides of apigenin and luteolin isolated (*Plant. Med. Phytother.* 1977, *11*, 112; *Chem. Abstr.* 1977, *87*, 114686 e); isoorientin-3'-O-glucoside isolated from leaves (*Planta Med.* 1978, *34*, 442).

Distribution : Himalayas from Kashmir to Bhutan, alt. 1000-4500 m, Meghalaya, alt. 1000-1500 m and hills of Deccan Peninsula.

G. prolata Balf.f. syn. *G. ornata* sensu Clarke p.p.

Luteolin, isoorientin, isovitexin and O-glycosides of apigenin and luteolin isolated (*Plant. Med. Phytother.* 1977, *11*, 112; *Chem. Abstr.* 1977, *87*, 114686 e).

Distribution : Sikkim and Bhutan, alt. 3300-4500 m.

G. quadrifaria Clarke; see *G. pedicellata* (D. Don) Wall. ex Griseb.

G. quadrifaria Clarke var. *pilosula* Clarke; see *G. pedicellata* (D. Don) Wall. ex Griseb.

G. sikkimensis Clarke

Luteolin, isoorientin, isovitexin and O-glycosides of apigenin and luteolin isolated (*Plant. Med. Phytother.* 1977, *11*, 112; *Chem. Abstr.* 1977, *87*, 114686 e).

Distribution : Sikkim Himalayas, alt. 3000-4200 m.

G. squarrosa Clarke; see *G. pedicellata* (D. Don) Wall. ex Griseb.

G. tibetica King

Out of four new alkaloids isolated, two characterised as gentiatibetine and isogentialutine (*Pr. Nauk Akad. Med. Wroclawiu* 1976, *8*, 3; *Chem. Abstr.* 1977, *86*, 103037 x).

Distribution : Eastern Himalayas, Sikkim and Bhutan, alt. 3300 m.

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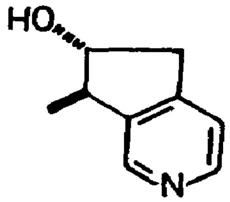

Isogentialutin

GERANIUM (Geraniaceae)

G. collinum Stephan ex Willd. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 194).

A hydrolysable tannide - kollinin - isolated from leaves and identified as 2,3-O-galloyl-4,6-O-[(+)hexahydroxydiphenoyl)-β-D-glucose (*Khim. Prir. Soedin.* 1970, *6*, 496; *Chem. Abstr.* 1971, *74*, 23075 v; *Fenol'nye So- lin.Ikh Fiziol. Suoistva. Matter. Vses. Simp. Fenol.nym Soedin.* 2nd 1971, 138; *Chem. Abstr.* 19/4, *81*, 63888 p).

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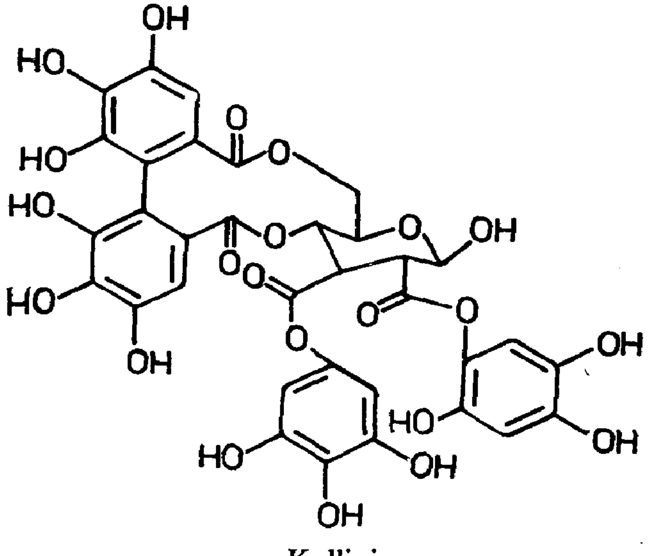

Kollinin

G. nepalense Sweet (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 124).

Kaempferol-7-rhamnoside and kaempferitrin isolated (*Shoyakugaku Zasshi* 1972, *26*, 144; *Chem. Abstr.* 1973, *79*, 89454 c).

GERBERA (Asteraceae)

G. gossypina (Royle) Beauv. syn. *G. lanuginosa* (Wall. ex DC.) Benth. & Hook.f.

Kumaon - Kapasi, Karki, Kaffi; Garhwal - Guani, Jhula, Kapas; P. - Patpalula, Kho, Kapasi, Tsar.

Taraxerol and taraxeryl acetate isolated from whole plant (*J. Indian Chem. Soc.* 1979, *56*, 326).

Distribution : Himalayas from Kashmir to Nepal, alt. 1300-3000 m.

G. lanuginosa (Wall. ex DC.) Benth. & Hook.f.; see *G. gossypina* (Royle) Beauv.

GINKGO (Ginkgoaceae)

G. biloba L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 195).

Eng. - Maiden hair tree.

Aqueous extract inhibited malate dehydrogenase, glucose-6-phosphate dehydrogenase (GPD) and isocitrate dehydrogenase (ID), GPD being the most sensitive and ID the least sensitive (*Boll. Soc. Ital. Biol. Sper.* 1972, *48*, 1031; *Chem. Abstr.* 1974, *81*, 23078 t).

β-Sitosterol and stigmasterol isolated from leaves (*Phytochemistry* 1970, *9*, 1879); structure elucidation of bilobalide A (*J. Am. Chem. Soc.* 1971, *93*, 3544); bilobalide shown to be related to ginkgolides A, B and C (*Ann. Chem.* 1972 , *759*, 158); novel phenolic lipids - 6-(pentadec-8-enyl)resorcylic (I) (97) and 6-tridecylresorcylic (3%) acids - isolated from seeds (*Phytochemistry* 1976, *15*, 1959).

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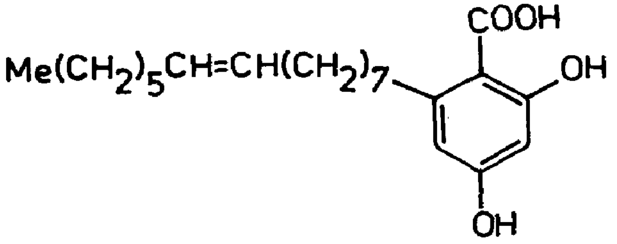
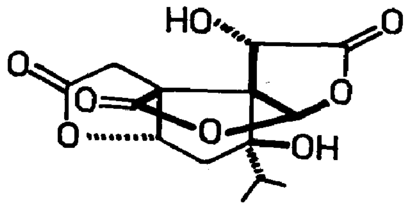


I



Bilobalide A

GISEKIA (Ficoidaceae)

G. pharnaceoides L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 125).

Oxalic, succinic, tartaric and citric acids, triacontane, myristone, tetracosanol and dotriacontane identified by PC (*Phytochemistry* 1972, *11*, 2883).

GLEDITSIA (Caesalpiniaceae)

G. sinensis Lamk.

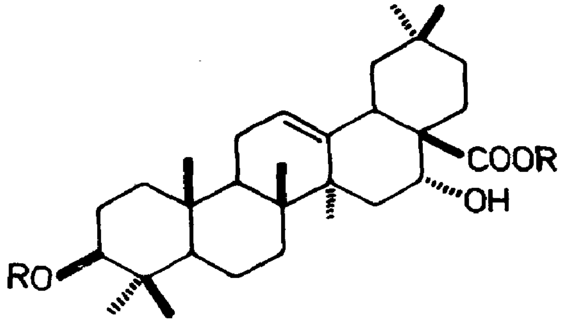
Luteolin-7-glucoside, isoquercitrin, vitexin, isovitexin, orientin and homoorientin isolated from leaves (*Chem. Pharm. Bull.* 1977, *25*, 3408).

Distribution : Native of China, grown in Indian gardens.

G. triacanthos L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 196).

Triacanthosides A, B, C and D isolated from pods; triacanthoside C on hydrolysis yielded oleanolic acid, glucose, arabinose, xylose and rhamnose (*Khim. Prir. Soedin.* 1970, *6*, 482; *Chem. Abstr.* 1970, *73*, 127740 d); a flavonoid mixture isolated from leaves contained vitexin, luteolin, its glucoside and saponaretin (isovitexin) (*Dokl. Bolg. Akad. Nauk* 1972, *25*, 71; *Chem. Abstr.* 1972, *77*, 72531 m); partial structures of triacanthosides A, B and C proposed (*Khim. Prir. Soedin.* 1972, *8*, 741; *Chem. Abstr.* 1973, *78*, 108259 r); structures of triacanthosides A and G (*Khim. Prir. Soedin.* 1972, *8* , 744; *Chem. Abstr.* 1973, *78*, 84728 q; *Khim. Prir. Soedin.* 1973, *9*, 314; *Chem. Abstr.* 1973, *79*, 66605 p); isolation and structure of triacanthoside F (*Khim. Prir. Soedin.* 1974, *10*, 105; *Chem. Abstr.* 1974, *80*, 121260 v).

NEW COMPOUNDS



Triacanthoside A1
R = Glu(4→1)Ara(4→1)Xyl, R′ = H
Triacanthoside G
R = Glu(4→1)Ara(4→1)Xyl, R′ = Rha(4→1)Ara(4→1)Xyl
Triacanthoside F
R = Glu(3→1)Xyl, R′ = Rha(4→1)Glu(3→1)Xyl(4→1)Xyl

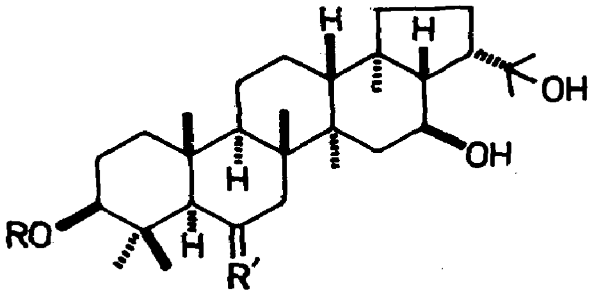
GLINUS (Ficoidaceae)

G. lotoides L. syn. *Mollugo lotoides* (L.) Kuntze, *M. hirta* Thunb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1956, p. 196).

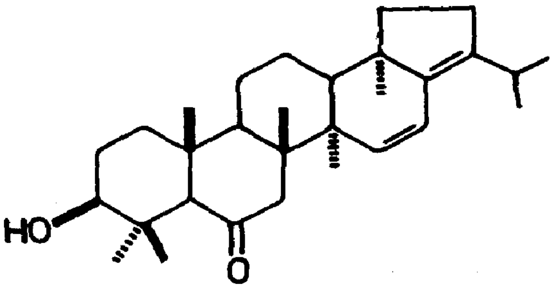
New sapogenins - mollugogenols C and E - along with mollugogenols A and B isolated (*J. Indian Chem. Soc.* 1969, *46*, 96, 1061; *Indian J. Chem.* 1970, *8*, 1042); β- and γ-sitosterol glucosides and oleanolic acid isolated (*J. Indian Chem. Soc.* 1973, *50*, 163); a new triterpene glycoside - mollugocin A - isolated and characterised as mollugogenol A-3[α-

arabinofuranosyl(1→5)-α-L-arabinofuranosyl(1→4)-β-D-glucopyranoside] (*J. Indian Chem. Soc.* 1976, *53*, 598; *Phytochemistry* 1976, *15*, 831); mollugogenol F isolated and its structure determined (*Indian J. Chem.* 1975, *13*, 947); structure of mollugogenol D elucidated (*Indian J. Chem.* 1976, *14B*, 59); stereostructures of mollugogenols A and E established (*Phytochemistry* 1976, *15*, 433).

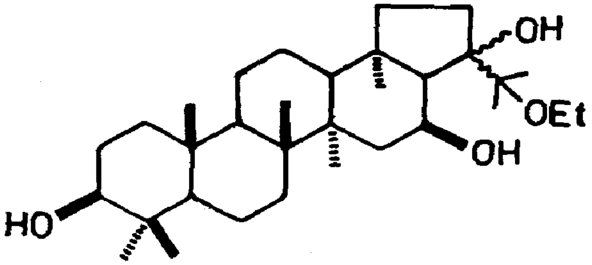
NEW COMPOUNDS



Mollugocin A
R = Glu(4→1)Ara(5→1)Ara, R′ = α-OH,H
Mollugogenol E
R = H, R′ = O
Mollugogenol F
R = H, R′ = H,H



Mollugogenol C



Mollugogenol D

G. oppositifolius (L.) A. DC. syn. *Mollugo oppositifolia* L., *M. spergula* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 197).

Chemical transformations of spergulagenic acid (*Tetrahedron Lett.* 1970, 1905); spergulagenin A isolated along with oleanolic acid and methyl spergulagenate and its structure determined (*Tetrahedron Lett.* 1974, 1173; *Chem. Pharm. Bull.* 1975, *23*, 355); a new bisnortriterpenoid sapogenol - spergulatriol - isolated from hydrolysate of root extract along with spergulagenin A, oleanolic acid and methyl spergulagenate and its structure determined (*Tetrahedron Lett.* 1976, 2327; *Chem. Pharm. Bull.* 1977, 25, 2430); stereo and crystal structure of spergulagenin A established (*Acta Crystallog.* 1976, *32B*, 58; *Trans. Bose Res. Inst*, Calcutta 1977, *40*, 117; *Chem. Abstr.* 1979, *90*, 104160 b).

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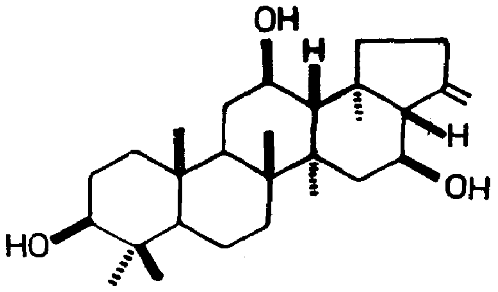
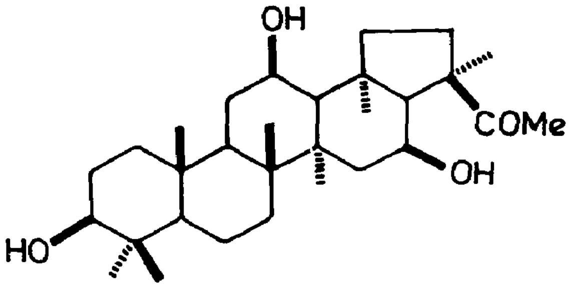


Spergulatriol



Spergulagenin A

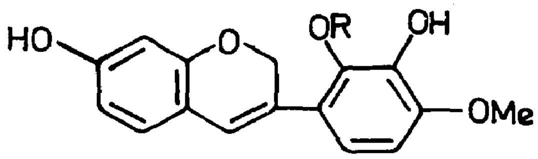
GLIRICIDIA (Papilionaceae)

G. sepium (Jacq.) Walp.

Isoflavenes - sepiol, 2′-O-methylsepiol - along with robinetin and 3′,4′,7-trihydroxy-flavanone isolated from heartwood (*J. Agric. Food Chem.* 1977, 25, 723; *Chem. Abstr.* 1977, 87, 35858 j).

Distribution : Native of tropical America, introduced into India as a shade and ornamental tree; grown widely in south India upto 1000 m.

NEW COMPOUNDS



Sepiol
R = H
2′-O-methylsepiol
R = Me

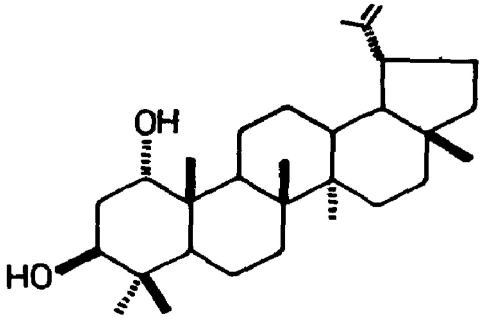
GLOCHIDION (Euphorbiaceae)

G. multiloculare Muell.- Arg.

A new triterpenoid - glochilocudiol - glochidiol, glochidone and dimedone isolated; structure of glochilocudiol (*Chem. Ind.* 1973, 1033).

Distribution : Sub-Himalayan tracts of Uttar Pradesh, north Bihar, foothills of Sikkim and Assam.

NEW COMPOUNDS



Glochilocudiol

G. valutinum Wight

H. - Chamari, Katu-manwa, Katu-maua, Anwin, Koria; Mar. - Paritza, Showra; Tam. - Paniccavi; Kan. - Salai-mara, Gol kamila, Sama; Assam - Dol-poduli, Uding-that.

Glochidone isolated from leaves (*Phytochemistry* 1973, *12*, 1826).

Distribution : Foothills of Himalayas from Kashmir eastwards and Meghalaya, ascending to 1000 m.

GLORIOSA (Liliaceae)

G. superba L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 198).

Seeds contained high level of colchicine (*Curr. Sci.* 1974, *43*, 87); cornigerine, 3-demethyl-N-formyl-N-deacetyl-β-lumicolchicine, 3-demethyl-γ-lumicolchicine, 3-demethyl-N-formyl-N-deacetylcolchicine, 2-demethylcolchicine, 2,3-didemethyl-N-deacetylcolchicine, 2,3-didemethylcolchicine and 3-demethylcolchicine isolated from plant (*Planta Med.* 1975, *28*, 201); β-sitosterol, its glucoside, a longchain fatty acid, β- and γ-lumicolchicines from fresh tubers (*Indian J. Chem.* 1976, *14*B, 908); luteolin, colchicine, N-formyldeacetylcolchicine, β- and γ-lumicolchicines, 3-demethylcolchicine, 2-demethylcolchicine and glucosides of 3-demethylcolchicine and luteolin isolated from flowers (*Proc. Nat. Acad. Sci.* India 1977, *47*A, 21; *Chem. Abstr.* 1978, *89*, 176337 s).

BIOLOGICAL ACTIVITY

Colchicine increased basal release of growth hormone from isolated rat anterior pituitary gland incubated *in vitro* but had little effect on basal release of LH, FSH or TSH. It enhanced release of LH and FSH by LH-releasing factor and FSH-releasing factor respectively. These effects were magnified by preincubation of pituitaries in colchicine for 2 hr. (*Proc. Soc. Exp. Biol. Med.* 1973, *142*, 1097; *Chem. Abstr.* 1973, *79*, 126 b); in primary tissue cultures of malignant human gliomas, colchicine (1-10 μg/ml) induced mild and nonspecific reversible reduction in cell motility and did not change adhesion (*Acta Neuropathol.* 1978, *44*, 21; *Chem. Abstr.* 1979, *90*, 16151 u).

GLYCINE (Papilionaceae)

G. max (L.) Merr. syn. *G. soja* sensu Hook.f. (non Sieb. & Zucc.), *Soja hispida* Moench (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 199).

Structures of soyasaponins I,II and III determined as 3-O-[α-L-rhamnopyranosyl(1→2)-β-D-galactopyranosyl(1→2)-β-D-glucuronopyranosyl)-soyasapogenol B, 3-O-[α-L-rhamnopyranosyl (1→2)-α-L-arabinopyranosyl(1→2)-β-D-glucuronopyranosyl] soyasapogenol B, respectively (*Chem. Pharm. Bull.* 1976, *24*, 121).

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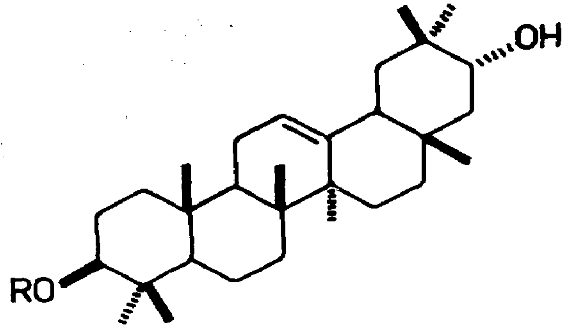

Soyasaponin I
R = Glu(2→1)Gal(2→1)Rha
Soyasaponin II
R = Glu(2→1)Ara(2→1)Rha
Soyasaponin III
R = Glu(2→1)Gal

G. soja Hook.f.; see *G. max* (L.) Merr.

GLYCOSMIS (Rutaceae)

G. arborea (Roxb.) DC.; see *G. pentaphylla* (Retz.) DC.

G. mauritiana (Lamk.) Tanaka syn. *G. pentaphylla* sensu Hook.f. p.p.

S. - Ashvashokota, Vananimbuka, Pathalagarudi; H. - Ban nimbu; Mar. Kirmira; Tel. - Golugu, Gongipadu; Tam. - Anam, Kula pannai; Kan. - Gurodagida, Manikyan; Mal. - Panal, Panchi.

β-Sitosterol and vitexin isolated (*Phytochemistry* 1971, *10*, 2247).
Distribution : Peninsular India.

G. pentaphylla (Retz.) DC. syn. *G. arborea* (Roxb.) DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 199).

Synthesis of glycozolidine (*Chem. Commun.* 1972, 537); a quinazolone alkaloid - glycophymine - and an amide - glycomide - isolated and characterised (*Phytochemistry* 1977, *16*, 2007); a new quinoline alkaloid - glycosolone - isolated and its structure determined (*Chem. Ind.* 1978, 272); synthesis of arborine and glycorine (*Chem. Ind.* 1978, 532).

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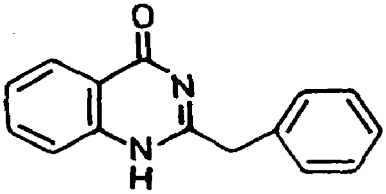
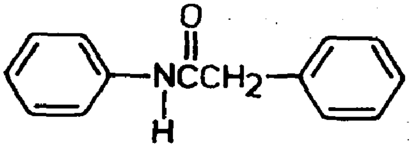
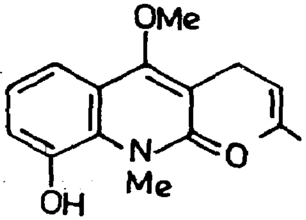


Glycophymine



Glycomide



Glycosolone

G. pentaphylla Hook.f.; see *G. mauritiana* (Lamk.) Tanaka

GLYCYRRHIZA (Papilionaceae)

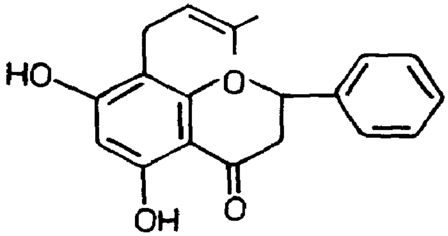
G. glabra L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 200).

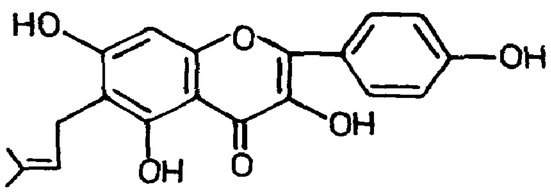
Maximum estrogenic activity in plant was found at beginning of vegetative growth; thereafter estrogens decreased about 2-fold with plant growth and development estrogen content decreased less significantly (*Matter. Biol. Vodov Roda Glycyrrhiza* 1970, *1*, 11; *Chem. Abstr.* 1972, *77*, 55618 v); LD50 values of crude extract containing 48-58% glycyrrhizin were 4.0-4.4, 1.42-1.70 and 14.2-18.0 g/kg in rats and mice after s.c., i.p. and oral administration respectively. Rats given 2.5g powder/kg/day orally for 3 months showed decrease in body weight gain, blood cell count and thymus weight; atrophic cortex and sporadic lymphofollicle formation also noted in medulla of thymus gland (*Oyo Yakuri*, 1977, *14*, 535; *Chem. Abstr.* 1978, *88*, 69205 e); a fraction (Fm 100) of root extract showed significant repairing effect on acetic acid ulcer in Shay rat (*Jap. J. Pharmacol.* 1971, *21*, 832).

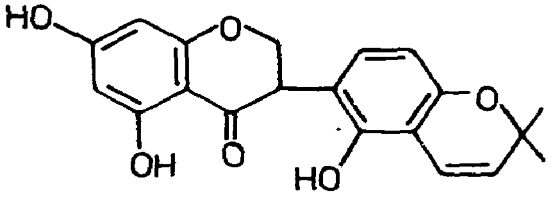
Out of twelve triterpenoids isolated from roots, eight characterised as glabrolide, deoxoglabrolide, isoglabrolide, glycyrrhetol, 18α-hydroxyglycyrrhetic acid, liquiritic acid, olean-12-en-3β-ol-30-oic acid and olean-11,13(18)-dien-3β-ol-30-oic acid (*Corsi. Semin. Chim.* 1968, *11*, 20; *Chem. Abstr.* 1970, *72*, 21799 u); a new flavanone - glabranine - isolated and characterised as 5,7-dioxy-8-(3',3'-dimethylallyl)-flavanone (*Khim. Prir. Soedin.* 1972, *8*, 805; *Chem. Abstr.* 1973, *78*, 94806 c); flavonoids - pinocembrin, mp. 196°, and prunetin, mp. 241° - isolated (*Khim. Prir. Soedin.* 1974, *10*, 93; *Chem. Abstr.* 1974, *81*, 60809 c); 4-hydroxychalcone, liquiritigenin and isoliquiritigenin isolated (*J. Pharm. Belg.* 1974, *29*, 560; *Chem. Abstr.* 1975, *83*, 111099 x); methyl olean-11,13(18)-diene-3,24-diol-30-oate, mp. 265°, isolated from aerial parts (*Khim. Prir. Soedin.* 1975, *11*, 101; *Chem. Abstr.* 1975, *83*, 75367 x); a new flavonol - licoflavonol - isolated along with kumatakenin, glycyrol and licoricone and characterised as 6-γ,γ-dimethylallylkaempferol (*Chem. Pharm. Bull.* 1976, *24*, 1242); a new isoflavan - glabridin - and flavanone - glabrol - isolated from roots (*Chem. Pharm. Bull.* 1976, *24*, 752); roots yielded three new compounds - 7-acetoxy-2-methylisoflavone (I), 7-methoxy-2-methylisoflavone (II) and 7-hydroxy-2-methylisoflavone (III) (*Phytochemistry* 1976, *15*, 352); flavonoid glycosides - liqurazid and liquiritin - isolated from rhizomes and roots of Egyptian plant (*Bull. Fac. Farm. Cairo Univ.* 1976, *14*, 213; *Chem. Abstr.* 1977, *87*, 206410 p);

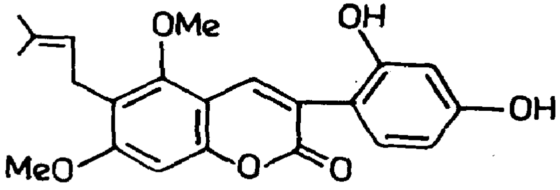
a new 2-methylisoflavone - glyzarin - isolated from roots and its structure elucidated (*Phytochemistry* 1977, *16*, 402); roots of one and two year old plant contained 6-7 and 7.14-9.81% glycyrrhizic acid respectively; horizontal rhizomes contained 7.14-8.41% (*Izv. Akad. Nauk. Kaz. SSR, Ser. Biol.* 1977, *15*, 15; *Chem. Abstr.* 1978, *88*, 71434 x); roots yielded a new isoflavone - glyzaglabrin, mp. 224° (*Curr. Sci.* 1977, *46*, 753); a method for extraction of glycyrrhizin and liquiritin from roots (Jpn. 7815,406 (1978) July, 28; *Chem. Abstr.* 1978, *88*, 197637 j; Jpn. 7808,765 (1978) March, 31; *Chem. Abstr.* 1978, *89*, 117790 m); a new isoflavone - licoisoflavone A - isolated and its structure determined (*Chem. Pharm. Bull.* 1978, *26*, 141); two other isoflavonoids - licoisoflavone B and licoisoflavanone - isolated from roots; along with isoliquiritigenin, formononetin, 4',7-dihydroxyflavone, echinatin and glybrol and characterised (*Chem. Pharm. Bull.* 1978, *26*, 144); a new 3-arylcoumarin - glycyrin - isolated from roots and characterised as 2',4'-dihydroxy-5,7-dimethoxy-6-γ,γ-dimethylallyl-3-arylcoumarin (*Chem. Pharm. Bull.* 1978, *26*, 135); three new isoflavans - hispaglabridin A, hispaglabridin B and 4'-O-methylglabridin - isolated from Spanish plant along with glabridin, glabrene, glabrol, formononetin and phaseollinisoflavan and their structures determined (*Heterocycles* 1978, *9*, 1533).

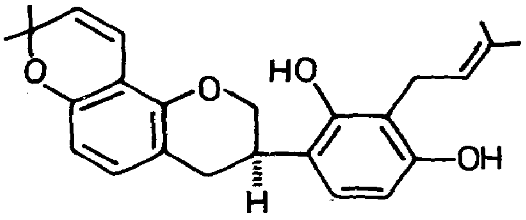
NEW COMPOUNDS

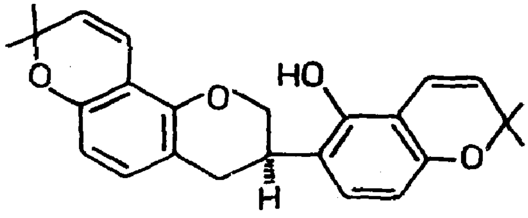

Glabranine

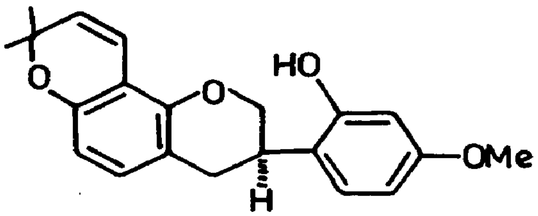

Licoflavonol


Licoisoflavanone
Licoisoflavone B
(2,3 Δ)

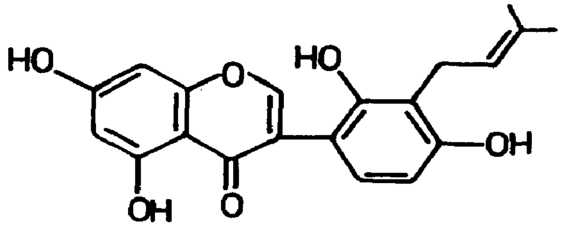

Glycyrin


Hispaglabridin A

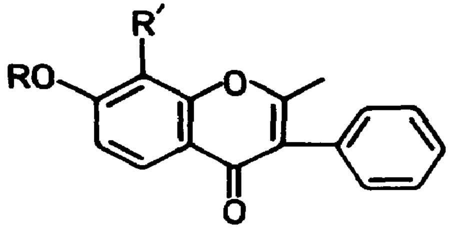

Hispaglabridin B



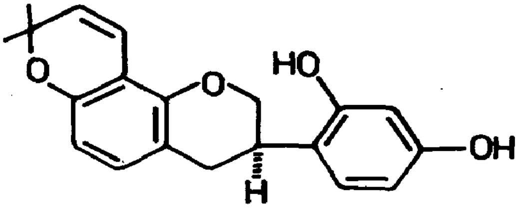
4'-O-Methylglabridin



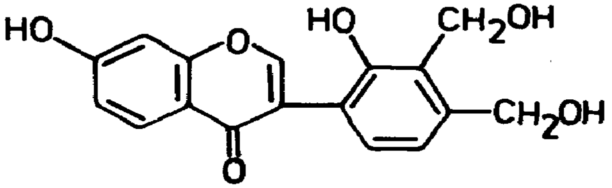
Licoisoflavone A



Glyzarin
R = H, R' = COMe
I
R = Ac, R' = H
II
R = Me. R' = H
III
R,R' = H



Glabridin



Glyzaglabrin

BIOLOGICAL ACTIVITY

Glycyrrhetic acid aluminium salt and its esters or dicarboxylic acid derivatives showed protective effect in rats with experimental ulcers (*Chung-Hua I Hsueh Tsa Chih*, Taipei 1976, *23*, 217; *Chem. Abstr.* 1977, *86*, 177203 v).

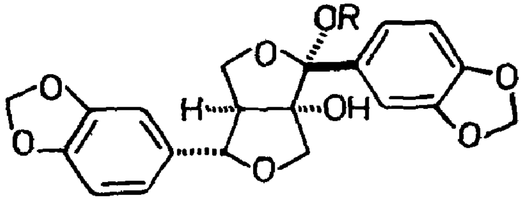
GMELINA (Verbenaceae)

G. arborea Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 203).

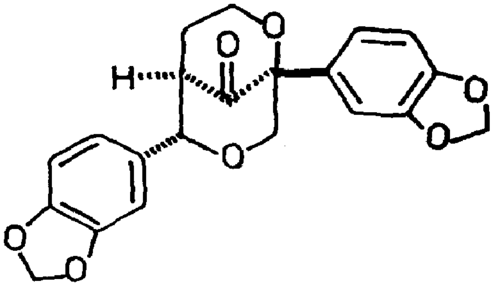
Apigenin, luteolin, quercetin, hentriacontanol and β-sitosterol isolated from leaves (*Indian J. Pharm.* 1970, *32*, 140); a new lignan - arboreol - isolated and its structure elucidated as 1-hydroxy-2-methoxy-2,6-bis(3,4-methylenedioxyphenyl)-3,7-dioxyphenyl)-3,7-dioxobicyclo [3.3.0] octane (*Tetrahedron Lett.* 1972, 2179; *Indian J. Chem.* 1972, *10*, 1120); structures of arboreol, 2-O-methylarboreol, 2-O-ethylarboreol, isoarboreol and gmelanone determined (*Tetrahedron* 1975, *31*, 1277); six new lignans isolated from heartwood characterised as 6''-bromoisoarboreol, 4-hydroxysesamin, 4,8-dihydroxysesamin, 1,4-dihydroxysesamin (gummadiol), 2-piperonyl-3-hydroxymethyl-4-(α-hydroxy-3,4-methylenedioxybenzyl)-4- hydroxytetrahydrofuran (I) and 4-epigummadiol-4-O-glucoside (*Tetrahedron* 1977, *33*, 133); hentriacontan-1-ol, ceryl alcohol, β-sitosterol, octacosanol and gmelinol obtained from roots

(*Planta Med.* 1977, *32*, 50); gmelofuran isolated and its crystal structure determined (*Tetrahedron Lett.* 1978, 4719).

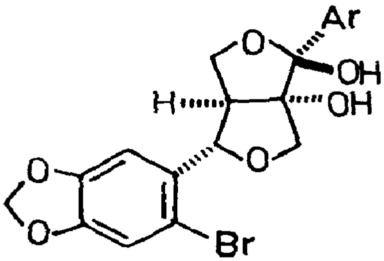
NEW COMPOUNDS



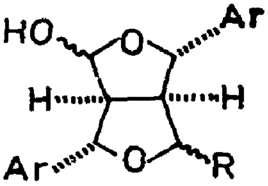
Arboreol
R = H
2-O-Methylarboreol
R = Me
2-O-Ethylarboreol
R = Et



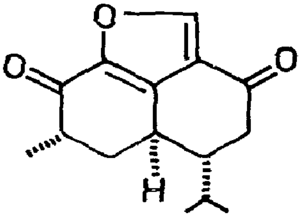
Gmelanone



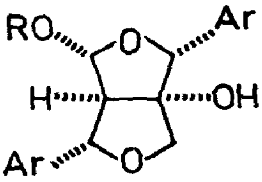
6''-Bromoisoarboreol
Ar = 3,4-Methylenedioxyphenyl



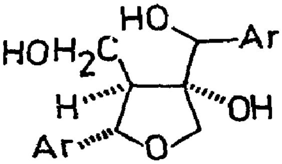
4-Hydroxysesamin
R = H
4,8-Dihydroxysesamin
R = OH
Ar = 3,4-Methylenedioxyphenyl



Gmelofuran



Gummadiol
R = H
4-Epigummadiol-4-O-glucoside
R = Glu
Ar = 3,4-Methylenedioxyphenyl



I
Ar = 3,4-Methylenedioxyphenyl

GNAPHALIUM (Asteraceae)

G. affine D. Don; see *Pseudognaphalium luteo-album* L. ssp. *affine* (D. Don) Hillard & Burtt

G. luteo-album L. var. *multiceps* (Wall. ex DC.) Hook.f.; see *Pseudognaphalium luteo-album* L. ssp. *affine* (D. Don) Hillard & Burtt

G. multiceps Wall. ex DC.; see *Pseudognaphalium luteo-album* L. ssp. *affine* (D. Don) Hillard & Burtt

GNETUM (Gnetaceae)

G. gnemon L.

Isovitexin, its 7-O-glucoside, vicenin-2, isoswertisin, orientin and isoorientin isolated from leaves (*Phytochemistry* 1978, *17*, 1809).

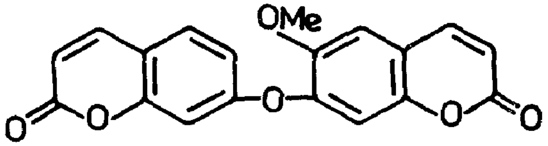
Distribution : Hills of north-eastern India.

GNIDIA (Thymelaeaceae)

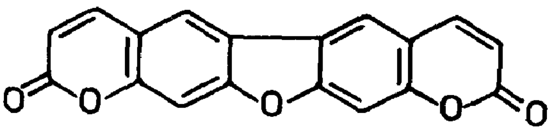
G. glauca (Fresen.) Gilg var. *glauca* syn. *Lasiosiphon eriocephalus* (Meissn.) Decne. (excl. syn. *Gnidia insularis* Gardn.) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 150).

Lasiocephalin isolated from plant, structure revised (*Chem. Ind.* 1973, 792); synthesis of lasiocephalin (*Indian J. Chem.* 1974, *12*, 450); a novel coumarin - lasioerin - isolated and its structure determined (*Chem. Ind.* 1978, 954).

NEW COMPOUNDS



Lasiocephalin



Lasioerin

GOMPHRENA (Amaranthaceae)

G. celosioides Mart.; see *G. serrata* L.

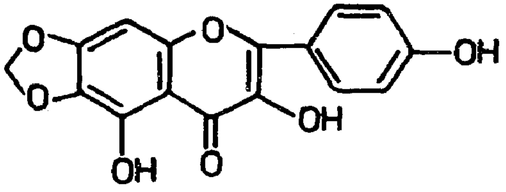
G. globosa L.

Eng. - Globe amaranth, Batchelor's button.

A new methylenedioxyflavonol - gomphrenol - isolated from leaves infected with tomato bushy stunt virus and its structure elucidated (*Phytochemistry* 1978, *17*, 2138).

Distribution : Introduced in India and grown in gardens.

NEW COMPOUNDS



Gomphrenol

G. serrata L. syn. *G. celosioides* auct. (non Mart.)

Ecdysterone isolated (*Phytochemistry* 1971, *10*, 2225).

Distribution : Introduced from tropical America and found throughout plains of India.

GONIOPHLEBIUM (Polypodiaceae)

G. amoenum (Wall. ex Mett.) syn. *Polypodium amoenum* Wall. ex Mett.

Fern-9(11)-ene, hop-22(29)-ene and β-sitosterol isolated (*J. Indian Chem. Soc.* 1978, *55*, 198).

Distribution : Himalayas from Garhwal to Bhutan and Meghalaya.

GOSSYPIUM (Malvaceae)

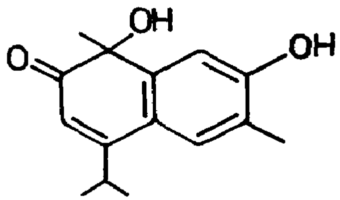
G. barbadense L. emend. Hutch. et al. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrota, PID, New Delhi, 1990, p. 204).

Gossypetin-3-glucoside, quercetin-7- and 3-glucosides, quercetin-3- and kaempferol-3-galactosides isolated (*Phytochemistry* 1972, *11*, 1518); leaves contained sucrose, glucose, fructose, rhamnose. salts of caffeic and chlorogenic acids, isoquercitrin and astragalin (*Egypt. J. Chem.* 1974, *17*, 135; *Chem. Abstr.* 1977, *86*, 117611 s); gossypol, 6-methoxygossypol, 6,6'-dimethoxygossypol, hemigossypol and methoxyhemigossypol obtained from roots (*Phytochemistry* 1975, *14*, 1077); gossypol and its methyl and dimethyl ethers isolated from pigment glands. Glands in young green tissues contained hemigossypolone-7-methyl ether; as glands aged in green tissues, sesquiterpenoid quinones replaced by C_{25}-terpenoids (*Phytochemistry* 1978, *17*, 1297).

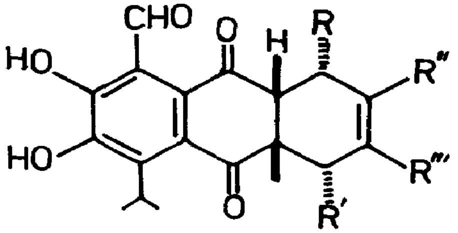
G. hirsutum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehtrotra, PID, New Delhi, 1990, p. 204).

Bisabolene oxide isolated from cotton buds and characterised (*Phytochemistry* 1972, *11*, 2118); total phospholipids in seeds estimated as 1.6% (*Khim. Prir. Soedin.* 1972, *8*, 663; *Chem. Abstr.* 1973, *78*, 108217 a); revision of the structure of lacinilene C and isolation of its 7-methyl ether from bracts (*Phytochemistry* 1975, *14*, 1041); gossypol, 6-methoxygossypol, 6,6'-dimethoxygossypol, hemigossypol and methoxyhemigossypol isolated from roots (*Phytochemistry* 1975, *14*, 1077); a sesterterpenoid - heliocide H_2 - isolated and its structure determined (*Tetrahedron Lett.* 1977, 567); gossypol isolated from pigment glands. Glands in young green tissues contained hemigossypolone as predominant terpenoid aldehyde; as glands aged in green tissues, sesquiterpenoid quinones replaced by several C_{25}-terpenoids (*Phytochemistry* 1978, *17*, 1297); two new sesterterpenoids - heliocide H_1 and heliocide H_4 - isolated and their stereostructures determined (*J. Agric. Food Chem.* 1978, *26*, 115; *Chem. Abstr.* 1978, *88*, 71417 u); heliocide H_3, an isomer of heliocide H_2, isolated from young cotton bolls (*Phytochemistry* 1978, *17*, 151).

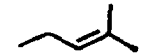
NEW COMPOUNDS



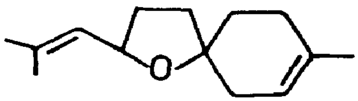
Lacinilene C



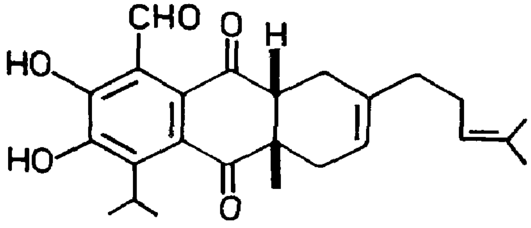
Heliocide H_1

R = , R′,R‴ = H,
R″ = Me
Heliocide H_4

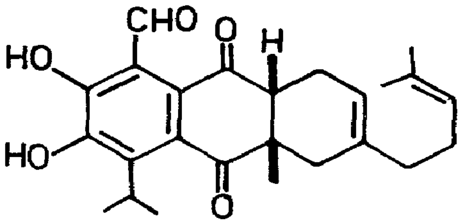
R,R″ = H, R′ =
R‴ = Me



Bisabolene oxide



Heliocide H_2



Heliocide H_3

BIOLOGICAL ACTIVITY

Heliocide H_1 was toxic to Heliothis virescens and involved in resistance of glanded cotton plant to this insect pest; heliocide H_4 showed very low level of toxicity to *H. virescens* (*J. Agric. Food Chem.* 1978, *26*, 115; *Chem. Abstr.* 1978, *88*, 71417 u); antibiotic activity against *H. virescens* was attributed to a condensed tannin (M.W. 4850) present in flower buds (*J. Insect. Physiol.* 1978, *24*, 113; *Chem. Abstr.* 1978, *89*, 20281 h).

GRANGEA (Asteraceae)

G. maderaspatana (L.) Poir. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 127).

Chondrillasterone and chondrillasterol isolated (*Phytochemistry* 1978, *17*, 2036).

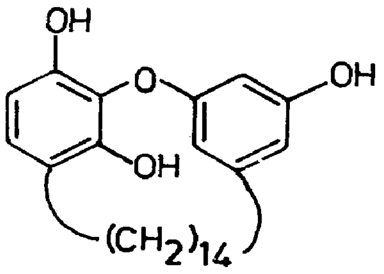
GREVILLEA (Proteaceae)

G. robusta A. Cunn. ex R. Br. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 204).

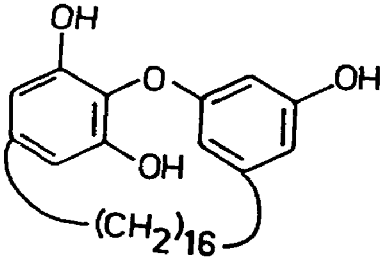
A novel phenol - robustol - isolated from leaves along with 2,5-dihydroxycinnamic acid and methyl 4-hydroxycinnamate; structure of robustol determined (*Tetrahedron Lett.* 1970, *325*; *Aust. J. Chem.* 1973, *26*, 2257); rutin and a mixture of macrocyclic phenols isolated from leaves,

three of these assigned structures I,II,III (*Aust. J. Chem.* 1973, *26*, 2257); new phenolic constituents - mono-norstriatol and bis-norstriatol - isolated (*Phytochemistry* 1976, *15*, 1418); seed oil triglycerides contained saturated fatty acids of chain length ranging from C_{16} to C_{26} (18.0), C_{14} to C_{28} ω-5-monoenes (22.5) C_{18} to C_{24} ω-9-monoenes (55.0), C_{18} diene (2.3) and C_{18}-triene (0.7%) (*Phytochemistry* 1977, *16*, 255).

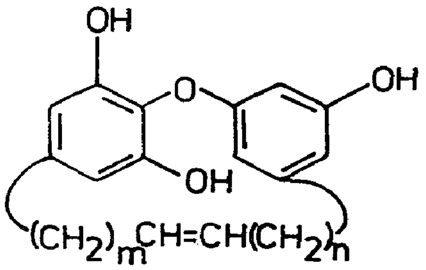
NEW COMPOUNDS



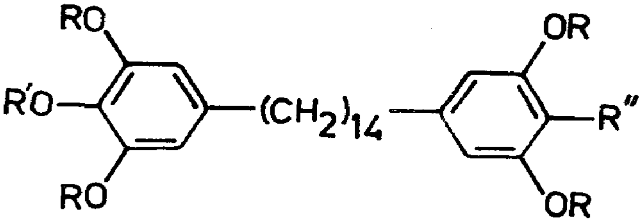
Robustol



I



II
m = 7, n = 5
III
m = 9, n = 3



Mono-norstriatol
R,R'' = H, R' = Me
Bis-norstriatol
R,R', R'' = H

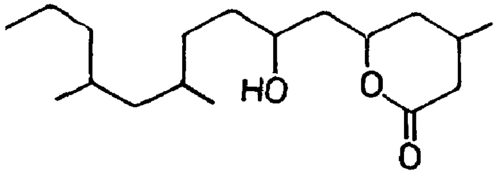
GREWIA (Tiliaceae)

G. asiatica L. see *G. subinaequalis* DC.

G. subinaequalis DC. syn. *G. asiatica* sensu Hook.f. p.p. (non L.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 205).

Taraxasterol, β-sitosterol and erythrodiol isolated from bark (*Curr. Sci.* 1973, *42*, 820); β-amyrin and betulin from bark (*J. Indian Chem. Soc.* 1974, *51*, 830); lupeol, lupenone, betulin and friedelin isolated from plant (*J. Indian Chem. Soc.* 1975, *52*, 553); β-sitosterol, quercetin, its 3-O-glucoside, naringenin and its 7-O-glucoside isolated from flowers (*J. Indian Chem. Soc.* 1976, *53*, 632); a new lactone - 3,21,24-trimethyl-5,7-dihydroxyhentriacontanoic acid δ-lactone isolated from flowers and its structure determined (*Phytochemistry* 1976, *15*, 1397); grewinol isolated from flowers and identified as tetratriacontan- 22-ol-13-one (*Lloydia* 1976, *39*, 372).

NEW COMPOUNDS



I

$Me(CH_2)_{11}CHOH(CH_2)_8CO(CH_2)_{11}Me$

Grewinol

GRISLEA (Lythraceae)

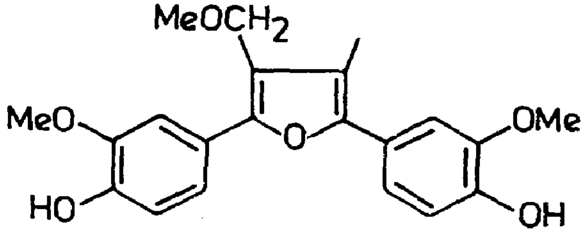
G. tomentosa Roxb; see *Woodfordia fruticosa* (L.) Kurz

GUAIACUM (Zygophyllaceae)

G. officinale L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 205).

A new furanoid lignan - furoguaiacidin - isolated from heartwood and its structure elucidated (*Chem. Ind.* 1974, 77).

NEW COMPOUNDS



Furoguaiacidin

GUAZUMA (Sterculiaceae)

G. tomentosa Kunth; see *G. ulmifolia* Lamk.

G. ulmifolia Lamk. syn. *G. tomentosa* Kunth (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 128).

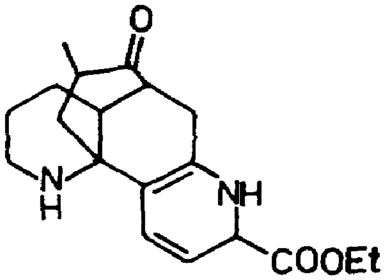
Friedelinol-3-acetate, friedelan-3β-ol, β-sitosterol and an alcohol isolated from leaves (*Curr. Sci.* 1977, *46*, 776); friedelin, β-sitosterol and betulin isolated from bark (*Planta Med.* 1977, *32*, 247).

GYMNEMA (Asclepiadaceae)

G. sylvestre (Retz.) Schult. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 205).

Structure of gymnamine isolated from leaves established (*Chem. Ind.* 1972, 537).

NEW COMPOUNDS



Gymnamine

GYMNOSPORIA (Celastraceae)

G. montana (Roth) Benth.; see *G. senegalensis* (Lamk.) Exell

G. ovata (W. & A.) Lawson; see *Maytenus ovatus* (Wall. ex Wt. & Arn.) Loesner

G. rothiana (Walp.) Laws.; see *Maytenus rothiana* (Walp.) A. Callen

G. senegalensis (Lamk.) Exell syn. *G. spinosa* (Forsk.) Fiori, *G. montana* (Roth) Benth. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 129).

Tingenone, 3-O-acetyloleanolic acid, hexacosane, betulin, β-amyrin, hexacosanol and β-sitosterol isolated from stem bark, root bark and leaves (*Planta Med.* 1978, *34*, 211).

G. spinosa (Forsk.) Fiori; see *G. senegalensis* (Lamk.) Exell

G. wallichiana (W. & A.) Laws.; see *Maytenus wallichii* (G. Don) Bennet & Sahni

GYNANDROPSIS (Capparaceae)

G. gynandra (L.) Briq.; see *Cleome gynandra* L.

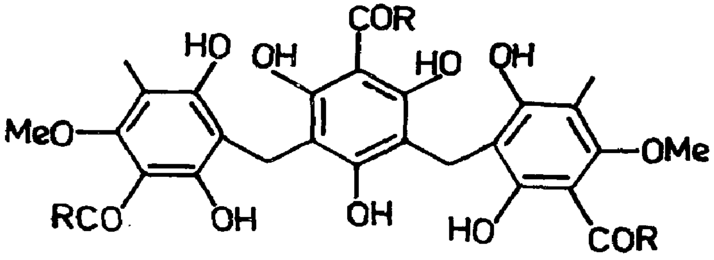
G. pentaphylla (L.) DC.; see *Cleome gynandra* L.

HAGENIA (Rosaceae)

H. abyssinica Gmel. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 130).

Four phloroglucinol derivatives - kosins K1, mp. 167°, K2, mp. 110°, K3, mp. 177° and K4, mp. 174° - isolated as mixtures of isobutyryl, isovaleryl and 2-methyl isobutyryl esters; structure of kosin K1 elucidated (*Phytochemistry* 1973, *12*, 2017).

NEW COMPOUNDS



Kosin K1
R = C_3H_7/C_4H_9

HALOXYLON (Chenopodiaceae)

H. salicornicum (Moq.) Bunge ex Boiss. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 206).

Haloxine and halosaline isolated (*Biochem. Physiol. Alkaloide, Int. Symp.* 4th 1969, 177; *Chem. Abstr.* 1972, *77*, 98800 y); presence of three C-29 sterols of stigmastane type detected by TLC, of which fucosterol isolated and identified (*Egypt. J. Chem.* 1974, *17*, 869; *Chem. Abstr.* 1977, *86*, 86168 w).

HAMELIA (Rubiaceae)

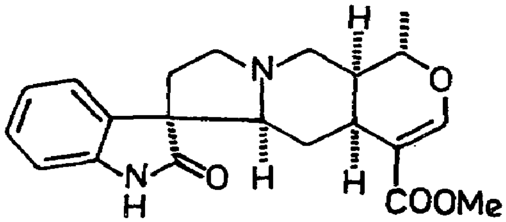
H. erecta Jacq.; see *H. patens* Jacq.

H. patens Jacq. syn. *H. erecta* Jacq.

β-Sitosterol, ursolic acid and β-sitosterol glucoside isolated from flowers and stems (*Curr. Sci.* 1973, *42*, 841); an oxindole alkaloid - isopteropodine - isolated and characterised (*Pharmazie* 1977, *32*, 415; *Chem. Abstr.* 1977, *87*, 197237 h); stigmast-4-en-3,6-dione isolated (*Pharmazie* 1978, *33*, 82; *Chem. Abstr.* 1978, *88*, 186110 f); apigenin, its glucuronide and rutin isolated from flowers (*J. Indian Chem. Soc.* 1978, *55*, 623).

Distribution : Indigenous to America, introduced into India and grown as ornamental in gardens.

NEW COMPOUNDS



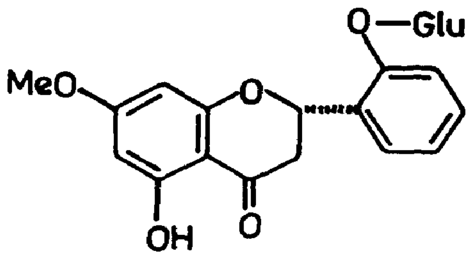
Isopteropodine

HAPLANTHUS (Acanthaceae)

H. tentaculatus Nees (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 130).

Isolation and structure of a new flavone glucoside - haplanthin (*Indian J. Chem.* 1976, *14B*, 644).

NEW COMPOUNDS



Haplanthin

HARPEPHYLLUM (Anacardiaceae)

H. caffrum Bernh.

Protocatechuic acid, gallic acid, methyl gallate, kaempferol-3-rhamnoside, kaempferol-3-galactoside, apigenin-7-glucoside, quercetin-3-glucoside, quercetin-3-rhamnoside, along with quercetin and kaempferol isolated from leaves (*Planta Med.* 1976, *29*, 129).

Distribution : South African plant, introduced into south India.

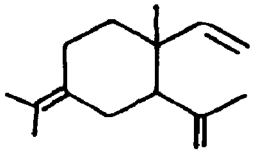
HEDERA (Araliaceae)

H. helix L.; see *H. nepalensis* K. Koch

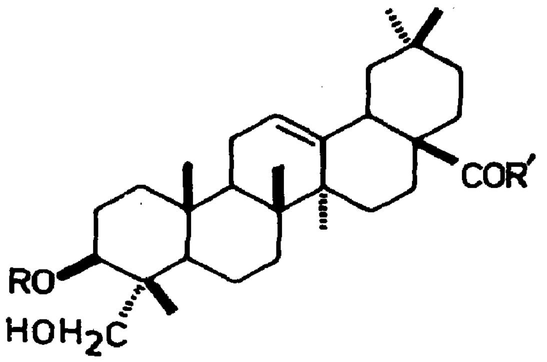
H. nepalensis K. Koch syn. *H. helix* auct. (non L.), *H. rhombea* Sieb. & Zucc. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 130).

β-Elemene, elixene and germacrene B isolated from leaves (*Chim. Ind.* 1970, *52*, 581; *Chem. Abstr.* 1970, *73*, 66750 h); emetine isolated (*Planta Med.* 1975, *27*, 127); four saponins - hederagenin-3-O-α-L-arabinopyranoside (K_3), hederagenin-3-O-α-L-rhamnopyranosyl-(1→2)-α-L-arabinopyranoside (K_6), 3-O-α-L-arabinopyranosyl-hederagenin-28-O-α-L-rhamnopyranosyl(1→4)-β-D-glucopyranosyl(1→6)-β-D-glucopyranosyl ester (K_{10}) and 3-O-α-L-rhamnopyranosyl (1→2)-α-L-arabinopyranosyl-hederagenin-28-O-α-L-rhamnopyrano syl (1→4)-β-D-glucopyranosyl(1→6)-β-D-glucopyranosyl ester (K_{12}) isolated from stems and characterised (*Chem. Pharm. Bull.* 1978, *26*, 655).

NEW COMPOUNDS



Elixene



K3
R = Ara, R′ = OH
K6
R = Ara(2→1)Rha, R′ = OH
K10
R = Ara, R′ = Glu(5→1)Glu(4→1)Rha
K12
R = Ara(2→1)Rha, R′ = Glu(5→1)Glu(4→1)Rha

BIOLOGICAL ACTIVITY

Hederagenin showed highly significant antiinflammatory activity against carrageenin-induced oedema and formaldehyde-induced arthritis in cat (*Indian J. Med. Res.* 1970, *58*, 724).

H. rhombea Sieb. & Zucc.; see *H. nepalensis* K. Koch

HEDYCHIUM (Zingiberaceae)

H. acuminatum Rosc. syn. *H. spicatum* Ham. ex Smith var. *acuminatum* (Rosc.) Wall.

H. - Kapura-kachari; S. - Karpurakachali, Gandhashati; B. - Ekangi; Trade - Kapurkachri.

α-Pinene, β-pinene, limonene, 1,8-cineole, linalool, camphor, linalyl acetate, terpineol, borneol, caryophyllene, γ-cadinene, humulene, terpinolene and p-cymene from essential oil (*Indian Perfum.* 1977, *21*, 79; *Chem. Abstr.* 1978, *88*, 177008 b).

Distribution : Himalayas from Garhwal to Sikkim upto 2400 m.

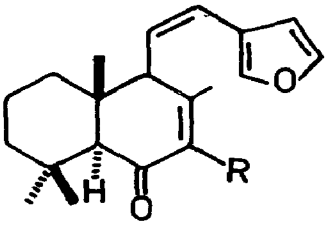
H. spicatum Ham. ex Smith (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 130).

Essential oil of rhizomes showed tranquillising activity of short duration; it depressed conditioned avoidance response, rotarod performance and potentiated pentobarbitone hypnosis (*Indian J. Pharmacol.* 1979, *11*, 147).

Structure determination of a furanoid diterpene - hedychenone - isolated from rhizomes (*Phytochemistry* 1975, *14*, 1059); 7- hydroxyhedychenone isolated from rhizomes (*Phytochemistry* 1976, *15*, 827); benzyl cinnamate, 1,8-cineole, benzyl acetate and lindyl acetate isolated (*Indian Perfum.* 1977. *22*, 129; *Chem. Abstr.* 1978, *89*, 152564 n); detection of cineole,

limonene, γ-terpinene, β-phellandrene, p-cymene, linalool, β-caryophyllene and β-terpineol in rhizome essential oil by GLC (*Parfum. Kosmet.* 1979, *60*, 245; *Chem. Abstr.* 1979, *91*, 181259 p).

NEW COMPOUNDS



Hedychenone
R = H
7-Hydroxyhedychenone
R = OH

H. spicatum Ham. ex Smith var. *acuminatum* (Roscoe) Wall.; see *H. acuminatum* Rosc.

HEDYOTIS (Rubiaceae)

H. affinis R. & S. syn. *Oldenlandia dichotoma* (Koen. ex Roth) Hook.f. (non Spreng.), *O. affinis* (R. & S.) DC.

Plant used as oral oxytocic in African folk medicine (*Lloydia* 1973, *36*, 209).

Tetramethylputrescine-(tetramethyl-1,4-diaminobutane) isolated (*Lloydia* 1973, *36*, 209).

Distribution : Bundelkhand and southwards through western peninsula on dry hills, alt. 300-900 m.

H. auricularia L. syn. *Oldenlandia umbellata* K. Schum. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 131, 180).

β-Sitosterol and hydrocarbons obtained from plant (*Phytochemistry* 1971, *10*, 2247).

H. diffusa Willd. syn. *Oldenlandia diffusa* (Willd.) Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 207).

Herb extract used in folk medicine showed significant activity against Ehrlich ascites leukaemia in mice (*T'ai-Wan Yao Hsueh Tsa Chih* 1971, *23*, 4; *Chem. Abstr.* 1974, *80*, 124650 h).

β-Sitosterol and ursolic acid isolated from herb (*T'ai-wan Yao Hsueh Tsa Chih* 1971, *23*, 4; *Chem. Abstr.* 1974, *80*, 124650 h).

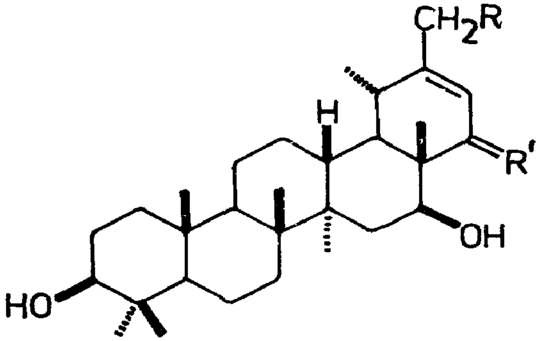
HELIANTHUS (Asteraceae)

H. annuus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 208).

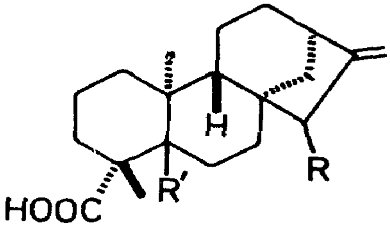
Estimation of palmitic (10.0), stearic (5.7) and linoleic (46.0%) acids in seed oil by chromatography (*Indian J. Appl. Chem.* 1972, *35*, 35; *Chem. Abstr.* 1973, *79*, 96832 c);

neoxanthin isolated from petals (*Phytochemistry* 1972, *11*, 3383); stigmast-7-en-ol; campest-7-en-ol, stigmast-7,24(28)-dienol, stigmast-7,24(25)-dienol and stigmast-7,9(11),24(28)-trienol isolated (*Phytochemistry* 1973, *12*, 1767); kaurenic and trachylobanic acids obtained from flowers and shoots; their glycosides also detected (*Bull. Acad. Pol. Sci. Ser. Sci. Biol.* 1974, *22*, 1; *Chem. Abstr.* 1974, *80*, 105868 u); sitosteryl-β-D-(2-O-fattyacyl)glucopyranoside and sitosteryl-β-D-(4-O-fattyacyl)- glucopyranoside isolated from seed lipids (*Dokl. Bolg. Akad. Nauk* 1976, *29*, 1463; *Chem. Abstr.* 1977, *86*, 103048 b); sitosteryl-β-D-(O-acyl)glucopyranoside, sitosterol, campesterol, stigmasterol, stigmast-7-en-ol, avenasta-7-en-ol detected in seed oil; ratio of linoleic and palmitic acids estimated as 10:1 in oil (*Dokl. Bolg. Akad. Nauk* 1976, *29*, 1289; *Chem. Abstr.* 1977, *86*, 52672 r); pectic acid from flowers shown to be linear galacturonan of α-(1→4) linked D-galacturonic acid residues (*Pakistan J. Sci. Ind. Res.* 1976, *19*, 123; *Chem. Abstr.* 1978, *88*, 152895 a); two new ψ-taraxene derivatives - heliantriol C and heliantriol F - isolated from flowers and their structures established (*Pol. J. Chem.* 1979, *53*, 1071 *Chem. Abstr.* 1979, *91*, 193465 r); in addition to known ent-kaur-16-en-19-oic and ent-trachylobanic acids, grandiflorolic acid (ent-15β-hydroxy-kaur-16-en-19-oic acid) and its 15-angeloyl derivative isolated from flowers (*An. Quim.* 1979, *75*, 428; *Chem. Abstr.* 1979, *91*, 120388 h).

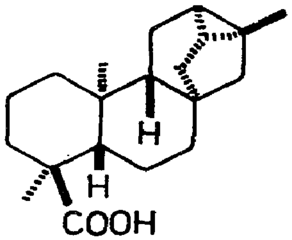
NEW COMPOUNDS



Heliantriol C
R = H, R' = α-OH, H
Heliantriol F
R = OH, R' = H,H



Kaurenic acid
R = H, R' = β-H
Grandifloric acid
R = β-OH, R' = H



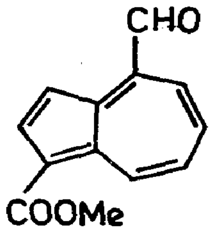
Trachylobanic acid

HELICHRYSUM (Asteraceae)

H. bracteatum Andr. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 209).

A new azulene characterised as 4-formyl-1-methoxycarbonyl-azulene (I) isolated from roots along with trideca-3,5,7,9,11-pentyne-1-ene and tetradeca-4,6-diene-8,10,12-triyne-1-ol (*Chem. Ber.* 1973, *106*, 1337).

NEW COMPOUNDS



I

HELIOTROPIUM (Boraginaceae)

H. crispum Desf. syn. *H. tuberculosum* Boiss., *H. undulatum* sensu Cl., p.p. *H. ramosissimum* Sieb. ex DC., (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 131).

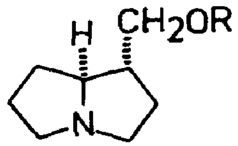
Heliotrine isolated from total alkaloids (0.85%) (*Bull. Fac. Sci.* Riyadh Univ. 1975, 7, 67; *Chem. Abstr.* 1976, *85*, 119597 v).

H. curassavicum L.

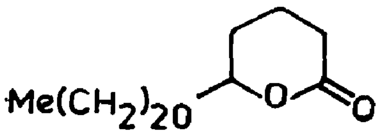
A new lactone isolated and characterised as tetrahydro-6-heneicosyl-2H-pyran-2-one (I) (*Experientia* 1977, *33*, 707); heliotrine, lasiocarpine, heliotrine N-oxide and 7-angeloyl-heliotridine isolated (*Indian J. Chem.* 1977, *15*B, 494); isolation and structures of curassavine, coromandalin and heliovicine (*Chem. Commun.* 1978, 423).

Distribution : Introduced from West Indies, found on Coromandel coast.

NEW COMPOUNDS



Curassavine
R = COC(OH)(CHMeEt)CH(OH)Me
Coromandalin
R = $COC(OH)(CHMe_2)CH(OH)Me(+)$
Heliovicine
R = $COC(OH)(CHMe_2)CH(OH)Me(-)$



I

H. eichwaldi Steud. ex DC.; see *H. ellipticum* Ledeb.

H. ellipticum Ledeb. syn. *H. eichwaldi* Steud. ex DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 131).

Lasiocarpine, heliotropine and their N-oxides isolated (*Khim. Prir. Soedin.* 1976, *12*, 681; *Chem. Abstr.* 1977, *86*, 152617 v).

H. indicum. L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 209).

Indicine, echinatin, supinene, heleurine, heliotrine, lasiocarpine and lasiocarpine N-oxide isolated from aerial parts (*Bangladesh Pharm. J.* 1976, *5*, 13; *Chem. Abstr.* 1977, *86*, 40191 v); estradiol detected by TLC in roots and bark and estimated spectrophotometrically as 3.5 μg/100 g (*Bangladesh J. Biol. Sci.* 1976, *5*, 45; *Chem. Abstr.* 1979, *90*, 3135 s).

H. ovalifolium Forsk.

β-Sitosterol and β-amyrin isolated (*Proc. Nat. Acad. Sci.* India 1972, *47*A, 72; *Chem. Abstr.* 1978, *89*, 176340 n).

Distribution : Throughout plains of India.

H. ramosissimum Sieb. ex DC.; see *H. crispum* Desf.

H. tuberculosum Boiss.; see *H. crispum* Desf.

H. undulatum Cl.; see *H. crispum* Desf.

HELLEBORUS (Ranunculaceae)

H. niger L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 210).

A new glucoside - substance G, mp. 209° - isolated from leaves and flowers (*Planta Med.* 1973, *24*, 73; *ibid.* 1974, *25*, 376).

H. virdis L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 132).

A bufatetraenolide (I) isolated from underground parts and its structure elucidated (*Planta Med.* 1973, *24*, 201); isolation method for sapogenin from roots and rhizomes (Ger. 2,519,261 & 2,416,979 (1976) Nov. 11; *Chem. Abstr.* 1977, *86*, 95984 m).

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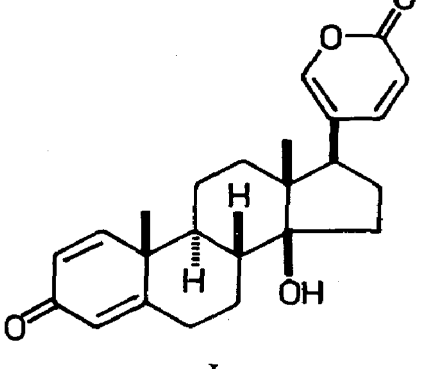


I

BIOLOGICAL ACTIVITY

Sapogenin showed ulcer-inhibiting and muscle-relaxing activities (Ger. 2,519,261 & 2,416,979 (1976) Nov. 11; *Chem. Abstr.* 1977, *86*, 95984 m).

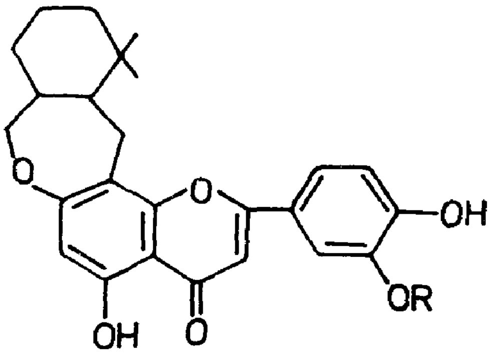
HELMINTHOSTACHYS (Helminthostachyaceae)

H. zeylanica (L.) Hook. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 132).

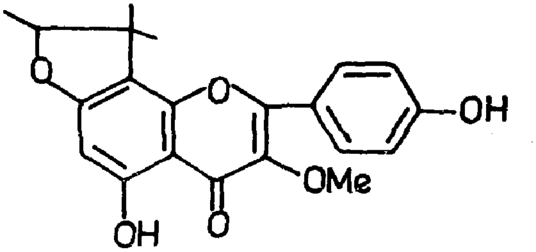
Pharmacognostic studies of rhizome and root carried out (*J. Res. Indian Med.* 1973, *8*, 40).

Structures of four flavonoids - ugonins A, B, C and D - isolated from rhizomes (*Chem. Pharm. Bull.* 1973, *21*, 1849, 1851).

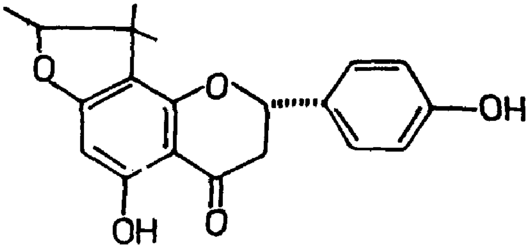
NEW COMPOUNDS



Ugonin A
R = H
Ugonin B
R = Me



Ugonin C



Ugonin D

HEMIDESMUS (Asclepiadaceae)

H. indicus (L.) R. Br. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 210).

Detection of hexatriacontane, lupeol, its octacosanoate, mp. 81°, α-amyrin, β-amyrin, its acetate and sitosterol in roots by chromatography (*Phytochemistry* 1973, *12*, 217).

HEMIGYROSA (Sapindaceae)

H. canescens (Roxb.) Blume; see *Lepisanthes tetraphylla* (Vahl) Radlk.

H. deficiens Bedd.; see *Lepisanthes tetraphylla* (Vahl) Radlk.

H. longifolia Hiern; see *Lepisanthes tetraphylla* (Vahl) Radlk.

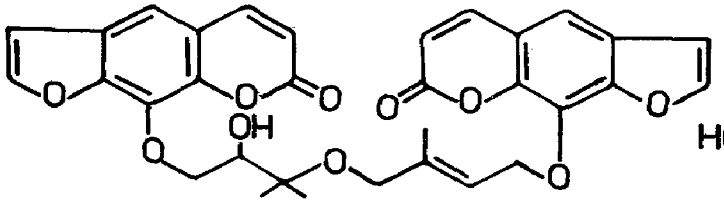
HERACLEUM (Apiaceae)

H. candicans Wall. ex DC.; see *H. lanatum* Michx.

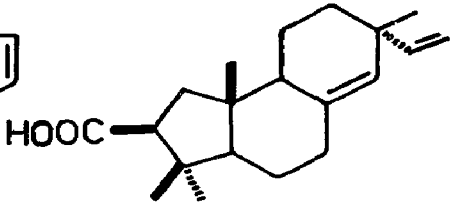
H. lanatum Michx. syn. *H. candicans* Wall. ex DC., *H. nepalense* D. Don (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 211).

Two new coumarins - tert-O-methylheraclenol and isoheraclenin - along with xanthotoxin, xanthotoxol and sphondin isolated (*Indian J. Chem.* 1970, *8*, 855; *ibid.* 1973, *11*, 410; *Phytochemistry* 1970, *9*, 1145); characterisation of a new coumarin glucoside - tert-O-β-glucosylheraclenol - isolated from roots (*Indian J. Chem.* 1970, *8*, 1146; *ibid.* 1973, *11*, 410); pimpinellin, isopimpinellin, bergapten, isobergapten, psoralen, isopsoralen and angelicin isolated from leaves (*Phytochemistry* 1970, *9*, 1145; *Indian J. Chem.* 1971, *9*, 731; *ibid.* 1973, *11*, 410; *Phytochemistry* 1975, *14*, 2533); a new bicoumarinyl derivative - candicanin (tert-O-imperatorinylheraclenol), mp. 153° - isolated from roots (*Tetrahedron Lett.* 1971, 4221; *Indian J. Chem.* 1973, *11*, 410); imperatorin, heraclenin, heraclenol and 8-geranyloxypsoralen isolated from roots and seeds (*Indian J. Chem.* 1971, *9*, 731; *ibid.* 1973, *11*, 410); synthesis of tert-O-methylheraclenol (*Indian J. Chem.* 1973, *11*, 530); structure elucidation of candicopimaric acid isolated from roots (*Indian J. Chem.* 1973, *11*, 1097).

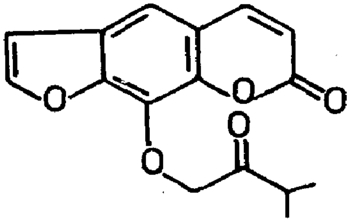
NEW COMPOUNDS



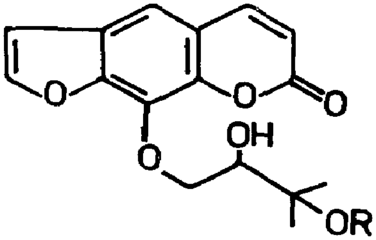
Candicanin



Candicopimaric acid



Isoheraclenin



Tert-O-methylheraclenol
R = Me
Tert-O-β-glucosylheraclenol
R = Glu

H. nepalense D. Don; see *H. lanatum* Michx.

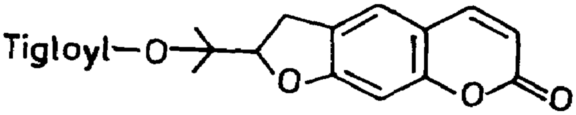
H. pedatum Wt.; see *Vanasushava pedata* (Wt.) Mukh. & Const.

H. sprengelianum W. & A.

Sprengelianine (tiglic ester of marmesin) isolated along with phellopterin, imperatorin, columbianadin, columbianetin and racemic marmesin (*Bull. Soc. Chim. Fr.* 1972, 208).

Distribution : Nilgiri Hills.

NEW COMPOUNDS



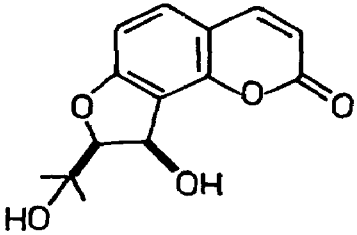
Sprengelianine

H. thomsoni Clarke; see *Platytaenia lasiocarpa* (Boiss.) Rech.f. & Riedl ssp. *thomsonii* (Cl.) Rech. f. & Riedl

H. wallichii DC. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 132).

Bergapten, isobergapten, isopimpinellin and sphondin obtained from roots (*Phytochemistry* 1975, *14*, 2533); in addition to cycleanine, isochondodendrine, columbianetin, marmesin and stigmasterol, an alkaloid - vaginidiol - isolated from roots and characterised (*Phytochemistry* 1976, *15*, 576).

NEW COMPOUNDS



Vaginidiol

HERITIERA (Sterculiaceae)

H. fomes Buch.-Ham.; see *H. minor* Lam.

H. minor Lam. syn. *H. fomes* Buch.-Ham.

B. & Oriya - Sundri.

Triacontanol,friedelin, taraxerol, β-amyrin and β-sitosterol isolated from leaves and bark (*J. Indian Chem. Soc.* 1978, *55*, 414).

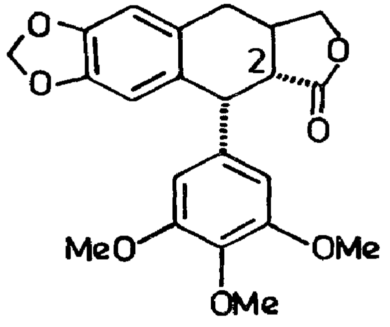
Distribution : Deltaic regions of the Ganges, Brahmaputra, Mahanadi and coastal areas of eastern peninsula.

HERNANDIA (Hernandiaceae)

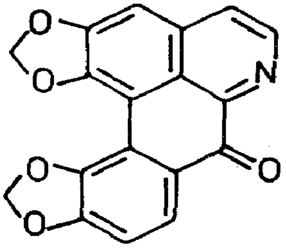
H. ovigera L. syn. *H. peltata* Meissn. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 211).

A new oxoaporphine alkaloid - hernandonine - isolated from trunk bark and characterised as 1,2;10,11-bismethylenedioxy-dibenzo[de,g]quinolin-7-one, hernovine, hernangerine and their N-methyl derivatives also isolated (*Tetrahedron Lett.* 1970, 3023; *Proc. Nat. Sci. Counc.* Part 2 1974, *7*, 185; *Chem. Abstr.* 1977, *86*, 127150 e; *J. Chinese Chem. Soc.* 1976, *23*, 29; *Chem. Abstr.* 1976, *85*, 37125 a); synthesis of hernandaline and thalicarpine (Ger. 2,161,187 (1973) Jun. 14; *Chem. Abstr.* 1973, *79*, 53659 j); epiaschantin and epimagnolin isolated from leaves and characterised;former was piscicidal (*Tetrahedron Lett.* 1973, 335); 1,2-methylenedioxy-7H,8,9-dimethoxydibenzo [de,g] quinolin-7-one (I) isolated from stem along with ovigerine (*Proc. Nat. Sci. Counc.* Part 2 1974, *7*, 185; *Chem. Abstr.* 1977, *86*, 127150 e; *J. Chinese Chem. Soc.* 1976, *23*, 29; *Chem. Abstr.* 1976, *85*, 37125 a); deoxypodophyllotoxin, thalicarpine and dehydrothalicarpine isolated from root bark (*J. Chinese Chem. Soc.* 1976, *23*, 29; *Chem. Abstr.* 1976, *85*, 37125 a); isolation and structure determination of oxothalicarpine (*J. Chinese Chem. Soc.* 1977, *24*, 91; *Chem. Abstr.* 1977, *87*, 130466 p); four lignans - deoxypodophyllotoxin, bursehernin, deoxypicropodophyllin and podorhizol - isolated from seeds along with an unidentified compound, mp. 270° (*Yakugaku Zasshi* 1979, *99*, 674; *Chem. Abstr.* 1979, *91*, 105186 x).

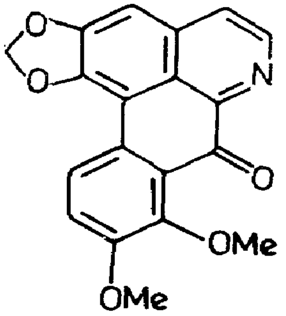
NEW COMPOUNDS



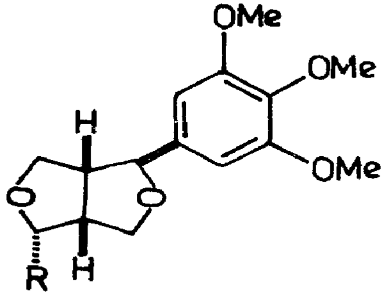
Deoxypodophyllotoxin
Deoxypicropodophyllin (2-epimer)



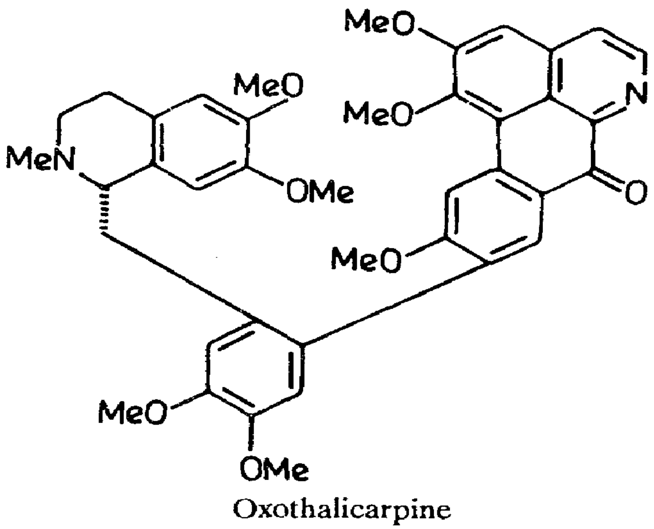
Hernandonine



I



Epiaschantin
R = piperonyl
Epimagnolin
R = 3,4-$(MeO)_2C_6H_3$



Oxothalicarpine

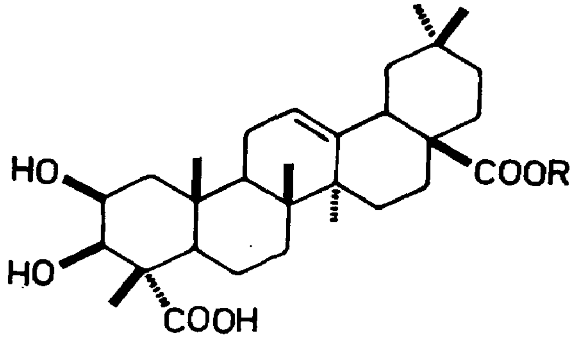
H. peltata Meissn.; see *H. ovigera* L.

HERNIARIA (Illecebraceae)

H. glabra L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 213).

Saponins I and II isolated and their structures elucidated (*Khim. Prir. Soedin.* 1970, *6*, 307; *Chem. Abstr.* 1970, *73*, 110070 n); gypsogenin and quillaic acid isolated (*Stud. Cercet. Biochem.* 1978, *21*, 89; *Chem. Abstr.* 1978, *89*, 176359 a).

NEW COMPOUNDS



I

R = Gentiobiose

II

R = Rha[(2→1)Fuc](4→1)Glu

H. hirsuta L. syn. *H. hirsuta* L. var. *incana* (Lamk.) Hook.f.

Gypsogenin and quillaic acid isolated (*Stud. Cercet. Biochem.* 1978, *21*, 89; *Chem. Abstr.* 1978, *89*, 176359 a); herniarin, scopoletin and umbelliferone isolated (*Khim. Prir. Soedin.* 1970, *6*, 624; *Chem. Abstr.* 1971, *74*, 50524 x).

Distribution : Western Himalayas, Kashmir to Kumaon upto 3000 m.

H. hirsuta L. var. *incana* (Lamk.) Hook.f.; see *H. hirsuta* L.

HERPESTIS (Scrophulariaceae)

H. monniera (L.) H.B. & K.; see *Bacopa monnieri* (L.) Pennell

HERPETOSPERMUM (Cucurbitaceae)

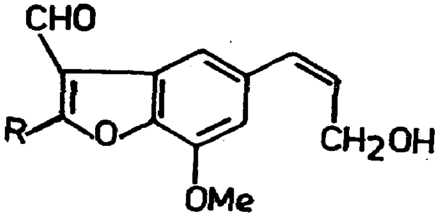
H. caudigerum Wall. ex Clarke; see *H. pedunculosum* (Ser.) Baill.

H. pedunculosum (Ser.) Baill. syn. *H. caudigerum* Wall. ex Clarke

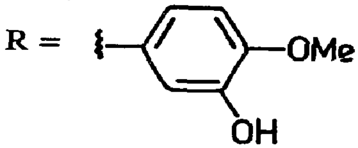
Isolation and structure of herpetal (*Phytochemistry* 1978, *17*, 2134); herpetotriol (trimer of coniferyl alcohol) isolated and characterised (*Tetrahedron Lett.* 1978, 4111).

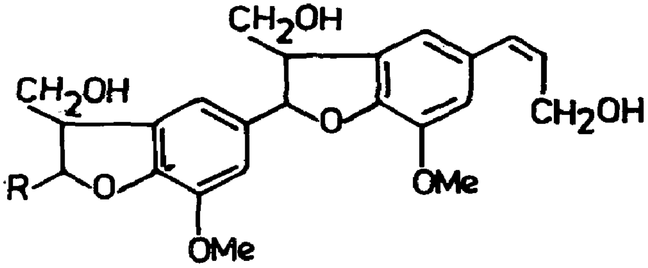
Distribution : Himalayas from Himachal Pradesh to Sikkim, Assam, Manipur, Nagaland and West Bengal, alt. 1200-2900 m.

NEW COMPOUNDS

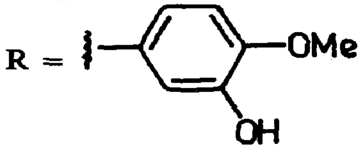


Herpetal





Herpetotriol



HESPERETHUSA (Rutaceae)

H. crenulata (Roxb.) M. Roem.; see *Naringi crenulata* (Roxb.) Nicolson

HETEROPHRAGMA (Bignoniaceae)

H. adenophyllum Seem. ex Benth. & Hook.f.; see *Fernandoa adenophylla* (Wall. ex G. Don) V. Steenis

H. quadriloculare (Roxb.) Schum. syn. *H. roxburghii* DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 132).

Hentriacontane and allantoin isolated from flowers; allantoin also present in fruit capsules; sitosterol and ursolic acid from leaves (*Phytochemistry* 1972, *11*, 2349).

H. roxburghii DC.; see *H. quadriloculare* (Roxb.) Schum.

HEVEA (Euphorbiaceae)

H. brasiliensis (H.B. & K) Muell.-Arg. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 213).

Vitexin and isovitexin isolated from leaves (*Phytochemistry* 1971, *10*, 2548); 10,13-epoxy-11-methyloctadeca-10,12-dienoic acid (I) isolated from latex (*Lipids* 1978, *13*, 905; *Chem. Abstr.* 1979, *90*, 118070 j).

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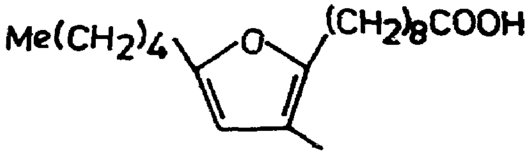

I

HIBISCUS (Malvaceae)

H. abelmoschus L.; see *Abelmoschus moschatus* Medik.

H. cannabinus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 214).

Anthocyanin - cannabinidin - isolated from flowers (*Khim. Prir. Soedin.* 1970, *6*, 129; *Chem. Abstr.* 1970, *73*, 106301 w); cannabinin (delphinidin-3-β-D-glucosido-β-D-xyloside) and myrtillin (delphinidin-3-β-D-glucoside) isolated from flowers (*Khim. Prir. Soedin.* 1971, *7*, 723; *Chem. Abstr.* 1972, *76*, 124169 a); limonene, phellandrene, α-terpenyl acetate, citral, p-tolualdehyde isolated from leaves, fruits and seeds of Egyptian plant (*Indian J. Chem.* 1975, *13*, 535; *Egypt J. Chem.* 1976, *19*, 633; *Chem. Abstr.* 1979, *91*, 120353 t); cyclohexanol, fructose, glucose, sucrose and mannose along with an unidentified polyhydroxysteroid, mp. 275°, and a steroid glycoside, mp. 273°, isolated (*Indian J. Chem.* 1975, *13*, 535); n-triacontane, n-tetracosane, n-pentacosane, n-hentriacontane, n-dotriacontane, n- tritriacontane, β-amyrin and β-sitosterol isolated from leaves (*Egypt. J. Chem.* 1976, *19*, 633; *Chem. Abstr.* 1979, *91*, 120353 t); myricetin-3′-α-D-glucoside isolated from flowers (*Khim. Prir. Soedin.* 1976, *12*, 388; *Chem. Abstr.* 1976, *85*, 106650 g); kaempferol-3-β-L-rhamnopyranosido-7-α-L-rhamnoside isolated (*Khim. Prir. Soedin.* 1976, *12*, 257; *Chem. Abstr.* 1976, *85*, 59602 f); proanthocyanidin isolated from roots composed of (-)epicatechol gallate and (-)epicatechol (*Khim. Prir. Soedin.* 1979, *15*, 233; *Chem. Abstr.* 1979, *91*, 171685 k); protocatechuic acid, vanillic acid and kaempferol-3,7-O-α-L-dirhamnofuranoside isolated from leaves (*Khim. Prir. Soedin.* 1979, *15*, 97; *Chem. Abstr.* 1979, *91*, 52705 g); hexacosane, heptacosane, octacosane, nonacosane, triacontane, hentriacontane, dotriacontane, tetratriacontane, pentatriacontane, hexatriacontane, heptatriacontane, tetracontane, hentacontane, hexacosanol, octacosanol, triacontanol, dotriacontanol and lignoceric, cerotic, montanic and melissic acids isolated from leaves (*Khim. Prir. Soedin.* 1979, *15*, 219: *Chem. Abstr.* 1979, *91*, 171667 j).

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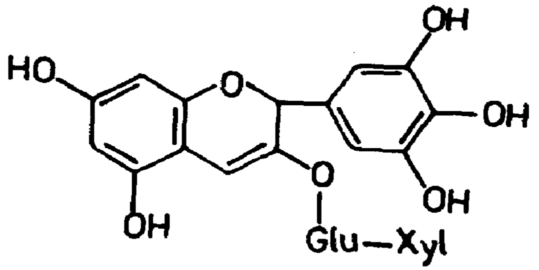

Cannabinin

H. rosa-sinensis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 214).

Quercetin-3-diglucoside, 3,7-diglucoside, cyanidin-3,5-diglucoside and cyanidin-3-sophoroside-5-glucoside isolated from deep yellow flowers; all above compounds and kaempferol-3-xylosylglucoside isolated from ivory white flowers (*Phytochemistry* 1972, *11*, 1518).

H. sabdariffa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 215).

Gossypetin-7-glucoside, 8-glucoside, cyanidin-3,5-diglucoside and cyanidin-3-(2′-glucosyl-rutinoside) isolated (*Phytochemistry* 1972, *11*, 1518); delphinidin-3-sambubioside (cannabinin), delphinidin-3-glucoside (myrtillin), cyanidin-3-sambubioside and cyanidin-3-glucoside isolated (*J. Food. Sci.* 1974, *38*, 810; *Chem. Abstr.* 1975, *82*, 13979 u); cholesterol, campesterol, stigmasterol, β-sitosterol, α-spinasterol and ergosterol isolated from seeds (*Planta Med.* 1979, *36*, 221).

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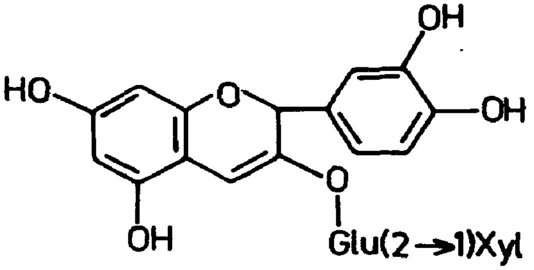


Cyanidin-3-sambubioside

H. syriacus L.

Eng. - Rose of Sharon, Shrubby althaea; B. - Swet jaba; P. - Gurhal; Bihar & Orissa - Gurhul.

Carotenoid pigments - cryptoxanthin, chrysanthemaxanthin and antheraxanthin - isolated from buds, leaves and flowers (*J. Agric. Food Chem.* 1972, *20*, 914; *Chem. Abstr.* 1972, *77*, 72573 b); canthin-6-one (6H-indolo(3,2,1-d,e)(1,5)naphthyridin-6-one) and a fatty acid fraction composed of lauric, myristic and palmitic acids isolated from bark (*Yakugaku Zasshi* 1978, *98*, 1508; *Chem. Abstr.* 1979, *90*, 51428 m).

Distribution : Native of China, grown in Indian gardens.

BIOLOGICAL ACTIVITY

Canthin-6-one and a fatty acid fraction which contained lauric, myristic and palmitic acids showed antifungal activity against Trichophyton interdigitale (*Yakugaku Zasshi* 1978, *98*, 1508; *Chem. Abstr.* 1979, *90*, 51428 m).

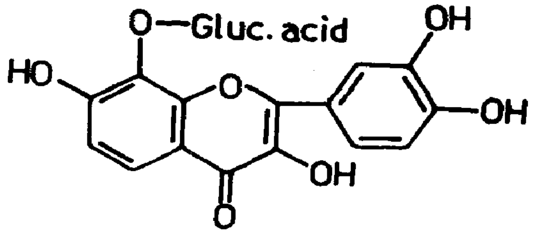
H. tiliaceus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 215).

β-Sitosterol, kaempferol-3-O-galactoside and quercetin-3-O-β-D-galactoside isolated from fruits (*Curr. Sci.* 1973, *42*, 770).

H. vitifolius L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 134).

A new gossypetin glucuronide - hibifolin - isolated from flowers along with gossypin and characterised (*Indian J. Chem.* 1974, *12*, 890).

NEW COMPOUNDS



Hibifolin

BIOLOGICAL ACTIVITY

Radioprotective effect of gossypin on X-ray - induced increase in capillary permeability of rat intestine studied; it produced dose-dependent depression of increased permeability which was more potent than that of citrus bioflavonoid (*Indian J. Exp. Biol.* 1977, *15*, 311); gossypin significantly reduced rat paw oedema and increased vascular permeability induced by various phlogistic agents (*Indian J. Pharmacol.* 1978, *10*, 277).

HIERACIUM (Asteraceae)

H. umbellatum L.

Apigenin, luteolin and its 7-β-D-glucoside isolated from aerial parts (*Khim. Prir. Soedin.* 1976, *12*, 660; *Chem. Abstr.* 1977, *86*, 86166 u).
Distribution : Western Himalayas, Kashmir to Garhwal, alt. 1500-3000 m.

HIPPEASTRUM (Amaryllidaceae)

H. equestre Herb.; see *Amaryllis equestris* Ait.

H. johnsonii Bury

Lycorine, tazettine and pseudolycorine isolated from bulbs (*Indian J. Pharm.* 1971, *33*, 56).
Distribution : Grown in gardens as ornamental.

HIPPOMANE (Euphorbiaceae)

H. mancinella L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 134).

2-Hydroxy-4,6-dimethoxyacetophenone, ellagic acid, its mono-, di- and trimethyl ethers and hippomanins A and B isolated from leaves and twigs (*Planta Med.* 1974, *25*, 166).

BIOLOGICAL ACTIVITY

Hippomanins A and B toxic to mice in dose range of 40-60 mg/kg, i.p. (*Planta Med.* 1974, *25*, 166).

HIPPOPHAE (Elaegnaceae)

H. rhamnoides L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 215).

Isorhamnetin-3-β-D-glucoside, isorhamnetin-3-rutinoside, isorhamnetin-3-β-D-glucosido-α-L-rhamnoside, isorhamnetin-3-β-sophorosido-7-L-rhamnoside and a new isorhamnetin tetroside containing glucose and rhamnose, isolated from fruits (*Planta Med.* 1972, *22*, 418); a flavonoid glycoside, mp. 220°, isolated from leaves (*Khim. Prir. Soedin.* 1975, *11*, 96; *Chem. Abstr.* 1975, *83*, 75365 v); isorhamnetin and astragalin isolated from leaves (*Khim. Prir. Soedin.* 1976, *12*, 97; *Chem. Abstr.* 1976, *85*, 30627 g); quercetin, kaempferol, isorhamnetin, myricetin and gallic acid isolated from leaves (*Khim. Prir. Soedin.* 1976, *12*, 663; *Chem. Abstr.* 1977, *86*, 136310 j); quebrachitol found in leaves (*Khim. Prir. Soedin.* 1976, *12*, 649; *Chem. Abstr.* 1977, *86*, 86160 n); isoquercitrin, isorhamnetin-3-β-D-glucofuranosido(1→6)-β-D-glucopyranoside and quercetin-3-galactoglucoside isolated from leaves (*Khim. Prir. Soedin.* 1977, *13*, 281; *Chem. Abstr.* 1977, *87*, 114616 g); rutin, quercetin, quercetin-7-O-rhamnoside, quercetin-3-O-methyl ether, isorhamnetin-3-O-rutinoside and isorhamnetin-3-O-β-D-glucoside isolated from fruits (*Khim. Prir. Soedin.* 1978, *14*, 403; *Chem. Abstr.* 1978, *89*, 143362 t).

H. rhamnoides L. ssp. *salicifolia* (D. Don) Sarvettaz syn. *H. salicifolia* D. Don (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 134).

A sterol glycoside, two phytosterols, three waxy compounds and a compound, mp. 222°, isolated from bark (*Indian Chem. Manufacturer* 1970, *8*, 31; *Chem. Abstr.* 1971, *74*, 108094 a).

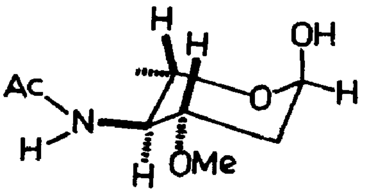
H. salicifolia D. Don; see *H. rhamnoides* L. ssp. *salicifolia* (D. Don) Sarvettaz

HOLARRHENA (Apocynaceae)

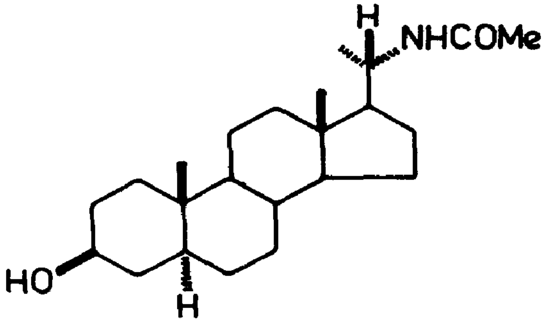
H. antidysenterica (Roth) DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, p. 216).

Two new aminoglycosteroids - holantosines A and B - isolated from leaves (*Tetrahedron* 1970, *26*, 1695); three aminoglycosteroids - N-acetylholantosine C, N-acetylholantosine D and N-acetylholarosine A - isolated from acylated extract of leaves; N-acetyl-L-holantosamine and its α- and β-methyl derivatives also isolated (*Bull. Soc. Chim. Fr.* 1971, 864); three new aminodeoxyglycosteroids - holarosine B and holantosines E and F - isolated from leaves (*Carbohydr. Res.* 1972, *24*, 297; *Chem. Abstr.* 1973, *78*, 4474 r); a new steroidal alkaloid - holacetine - isolated from root bark, characterised as (20S)-acetamido-5-pregnan-3β-ol (*Phytochemistry* 1976, *15*, 1173).

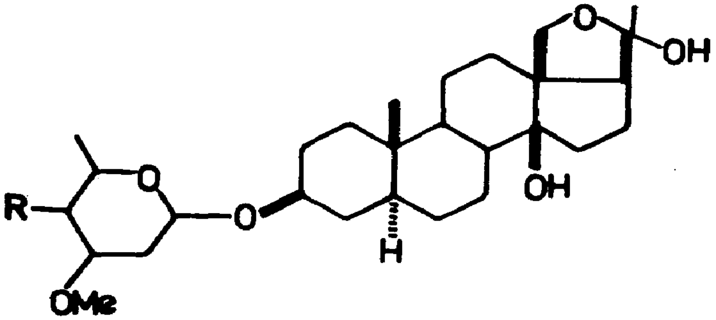
NEW COMPOUNDS



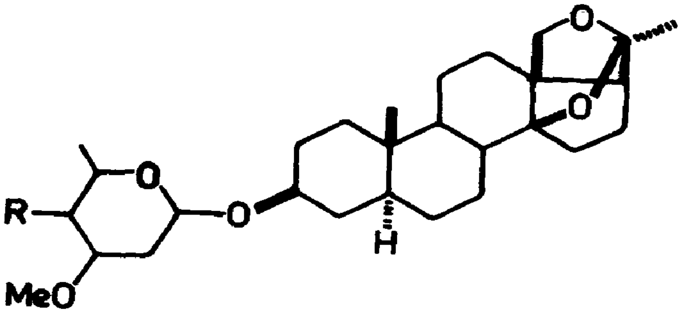
N-Acetyl-L-holantosamine



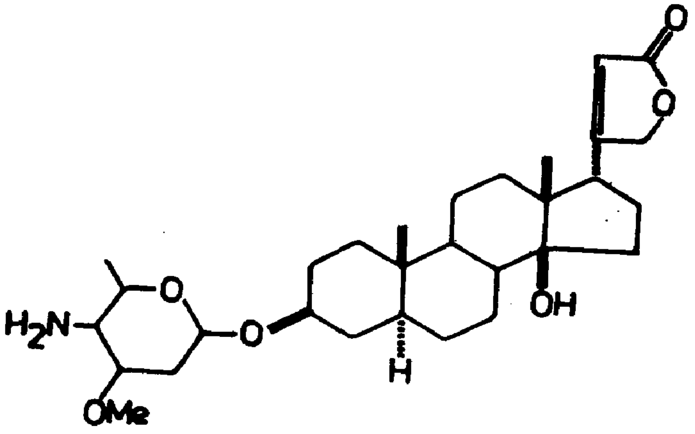
Holacetine



Holantosine A
R = αNH_2
Holantosine E
R = βNH_2



Holantosine B
R = αNH_2
Holantosine F
R = βNH_2



Holarosine B

H. mitis R. Br. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 217).

Purine base - triacanthin - isolated from fruits and seeds (*Ann. Pharm. Fr.* 1972, *30*, 837; *Chem. Abstr.* 1973, *78*, 156647 n; *Phytochemistry* 1972, *11*, 843); conamine, conessine, isoconessimine and holadienine, conkurchine, holarrhenine, holafebrine, holarrhimine and N3-methylholarrhimine isolated from bark (*Ann. Pharm. Fr.* 1972, *30*, 837; *Chem. Abstr.* 1973, *78*, 156647 n; *Ann. Pharm. Fr.* 1972, *30*, 535; *Chem. Abstr.* 1973, *78*, 40431 h); mitiphylline and N-demethylmitiphylline isolated from leaves (*Phytochemistry* 1972, *11*, 843; *Ann. Pharm. Fr.* 1973, *31*, 593; *Chem. Abstr.* 1974, *80*, 104110 d).

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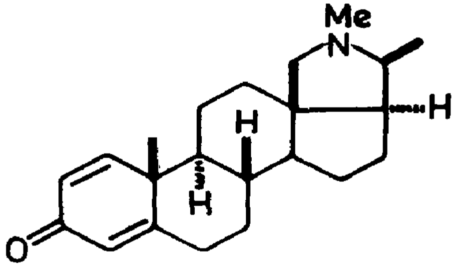


Holadienine

BIOLOGICAL ACTIVITY

Mitiphylline exhibited digitalis-like cardiotonic activity *in vivo* and *in vitro* on rabbit heart. It showed positive inotropic effect in isolated auricle preparation at 10 μg, whereas threshold dose of digitalin was 20 μg (*Ann. Pharm. Fr.* 1973, *31*, 593; *Chem. Abstr.* 1974, *80*, 104110 d).

HOLOPTELEA (Ulmaceae)

H. integrifolia (Roxb.) Planch. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 135).

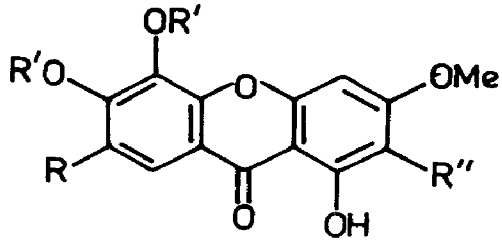
Hexacosanol, octacosanol, β-sitosterol and β-amyrin isolated from leaves; friedelin and friedelan-3-β-ol from stem bark (*Planta Med.* 1974, *26*, 394); 2α,3α-dihydroxyolean-12-en-28-oic acid isolated from heartwood (*Planta Med.* 1975, *27*, 290; *ibid.* 1977, *31*, 232); in addition, β-sitosterol and hederagenin from heartwood (*Planta Med.* 1977 *31*, 232).

HOPPEA (Gentianaceae)

H. dichotoma Hayne ex Willd. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 136).

Isolation of three new glycoxanthones (I,II and III) and two new flavanone glycosides (IV and V) and their characterisation; eight known xanthones, vitexin, isovitexin, gluanone, gluanol, friedelin and friedelan-3α-ol also isolated (*Phytochemistry* 1978, *17*, 2119).

NEW COMPOUNDS



I

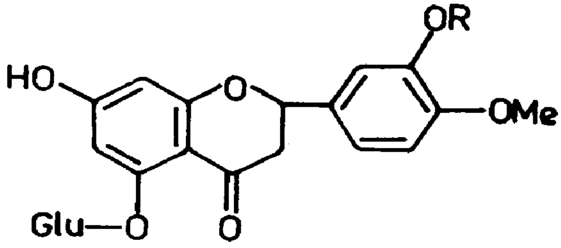
R = Glu, R′,R″ = H

II

R = H, R′ = Me, R″ = Glu

III

R,R′ = Me, R′ = Glu



IV

R = H

V

R = Me

HORDEUM (Poaceae)

H. vulgare L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 136).

An arabinogalacto(4-O-methylglucurono)-xylan isolated from leaves (*Phytochemistry* 1973, *12*, 1373).

BIOLOGICAL ACTIVITY

Hordenine (0.5-1 mg/kg) and its methyl ether (1.0 mg/kg) were effective bronchodilators in cats with proserine-induced bronchospasms, but showed little effect on normal cats (*Farmacol. Rastit. Veshchestv* 1976, 71; *Chem. Abstr.* 1978, *89*, 157340 w).

HOUTTUYNIA (Saururaceae)

H. cordata Thunb.

Plant extract (containing decanoyl acetaldehyde and quercitrin) as oral therapeutic agent for athlete's foot. Daily application of extract for two months (two doses/day) totally controlled infection (Jpn. 7,850,313 (1978) May 5; *Chem. Abstr.* 1978, *89*, 95001 a).

α-Pinene, β-pinene, camphene, β-myrcene, limonene, 1,8-cineole, ocimene, p-cymene, terpinolene, β-caryophyllene, humulene, linalool, terpinene-4-ol, 1-nonanol, nerol, geraniol, 1-dodecanol and carvacrol isolated from essential oil (*Nippon Kagaku Kaishi* 1972, 1157; *Chem. Abstr.* 1972, *77*, 105507 p); afzelin, hyperin, rutin, β-sitosterol, chlorogenic, palmitic, linoleic, oleic and stearic acids isolated from aerial parts (*Shoyakugaku Zasshi* 1978, *32*, 123; *Chem. Abstr.* 1979, *91*, 62628 y).

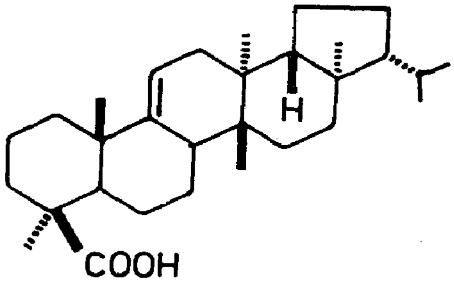
Distribution : Himalayas from Himachal Pradesh to Sikkim, Assam, Khasi Hills and Manipur, alt. 300-2000 m.

HUMATA (Davalliaceae)

H. griffithiana (Hook.) C. Chr. syn. *Davallia griffithiana* Hook.

Davallic acid isolated (*Shoyakugaku Zasshi* 1978, *32*, 260; *Chem. Abstr.* 1979, *91*, 96562 n).
Distribution : Meghalaya and Bhutan.

NEW COMPOUNDS



Davallic acid

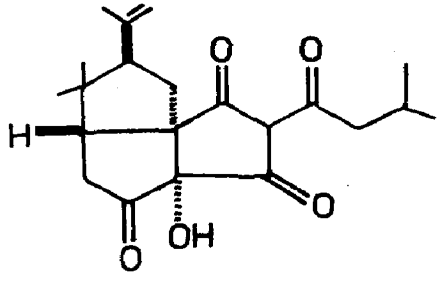
HUMULUS (Moraceae)

H. lupulus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 218).

Alcoholic extract exhibited strong spasmolytic effect on smooth muscle preparations of rabbit jejunum, guinea pig duodenum and rat uterus against spasmogenic effects of acetylcholine, barium chloride, atropine, papaverine and histamine. The musculotropic spasmolytic effects of extract were greater than its neurotropic spasmolytic effects. It also exhibited antioxytocic effects (*Agressologie* 1969, *10*, 405; *Chem. Abstr.* 1970, *72*, 41267 x).

β-Pinene, myrcene, α-humulene and β-humulene identified by GLC in essential oil from aerial parts (*Rev. Med.* 1977, *23*, 187; *Chem. Abstr.* 1978, *89*, 30570 r); 2,3,4-trithiapentane isolated from essential oil (*Phytochemistry* 1977, *16*, 2020); revised structure of tricyclodehydroisohumulone (*Tetrahedron Lett.* 1978, 2633).

NEW COMPOUNDS



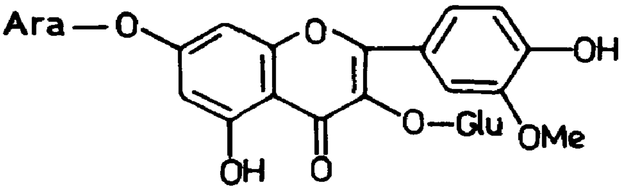
Tricyclodehydroisohumulone

HUNNEMANNIA (Papaveraceae)

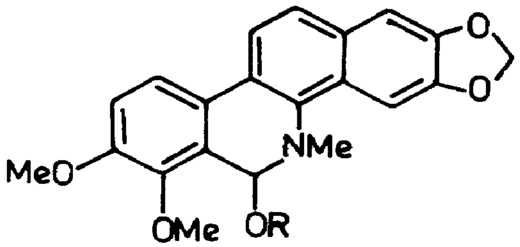
H. fumariaefolia Sweet (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 219).

A new flavonol glycoside - isorhamnetin-3-β-D-glucopyranosido-7-α-L-arabinopyranoside (I) - isolated from petals (*Lloydia* 1973, *36*, 166); artifactually formed pseudoalcoholates pseudomethanolates and pseudoethanolates of chelerythrin (II,III) and sanguinarine (IV,V), isolated from roots along with parent alkaloids (*Lloydia* 1978, *41*, 145).

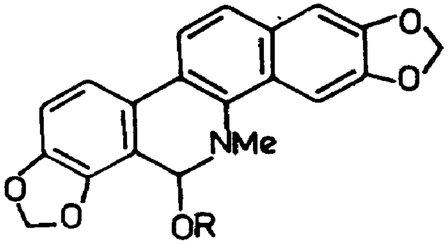
NEW COMPOUNDS



I



II
R = Me
III
R = Et



IV
R = Me
V
R = Et

BIOLOGICAL ACTIVITY

Pseudoalcoholates of chelerythrine and sanguinarine showed enhanced antimicrobial activity over the parent alkaloids and appeared to be useful drugs (*Llyodia* 1978, *41*, 145).

HUPERZIA (Huperziaceae)

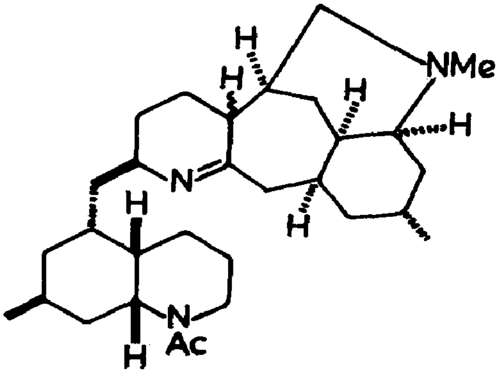
H. herteriana (Kumm.) Sen & Sen syn. *Lycopodium lucidulum* Michx.

Eng.- Lycopodium.

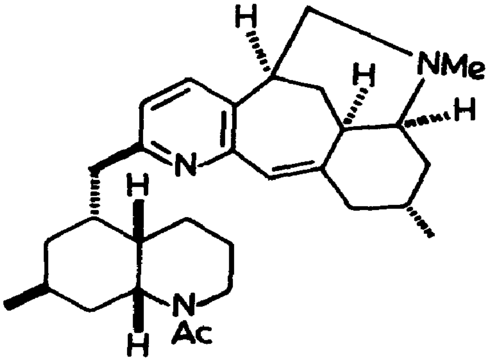
Isolation of lucidine B, dihydrolycolucine and lycolucine and their crystal structures elucidated (*Can. J. Chem.* 1979, *57*, 1105).

Distribution : Sikkim, Manipur and West Bengal.

NEW COMPOUNDS



Lucidine B



Lycolucine

HURA (Euphorbiaceae)

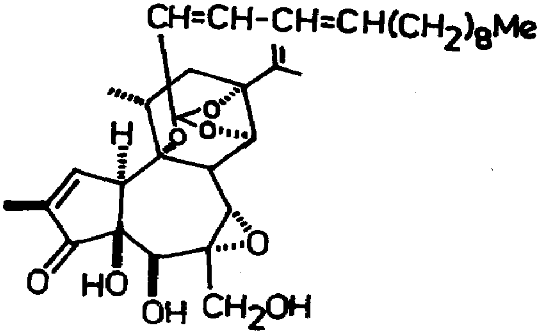
H. crepitans L.

Tel. - Simaburuga; Tam.- Mullarasanam; Kan.- Retidani.

Structure of piscicidal constituent - huratoxin - isolated from sap (*Agric. Biol. Chem.* 1971, *35*, 2113; *Chem. Abstr.* 1972, *76*, 113394 u).

Distribution : Native of tropical America, introduced into India in gardens, roadsides and in plantations.

NEW COMPOUNDS



Huratoxin

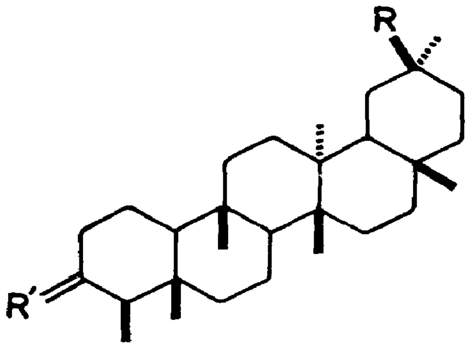
HYDNOCARPUS (Flacourtiaceae)

H. laurifolia (Dennst.) Sleummer; see *H. pentardra* (Buch.-Ham.) Oker

H. octandra Thw. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 137).

Six new triterpenoids - octandrolal, octandrolol, octandrolic acid, octandronal, octandronol and octandronic acids - isolated from bark and their structures assigned (*Chem. Ind.* 1973, 790).

NEW COMPOUNDS

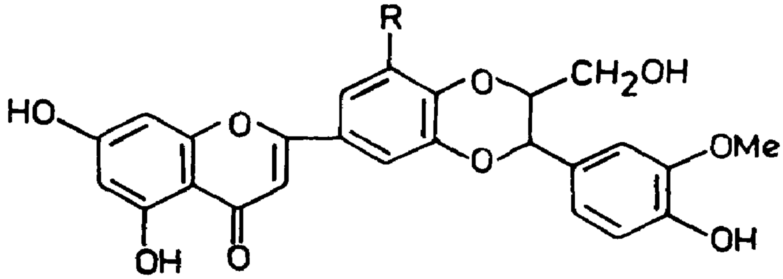


Octandrolal
R = CHO, R′ = α-OH,H
Octrandrolol
R = CH_2OH, R′ = α-OH,H
Octrandrolic acid
R = COOH, R′ = α-OH,H
Octrandronal
R = CHO, R′ = O
Octrandronol
R = CH_2OH, R′ = O
Octrandronic acid
R = COOH, R′ = O

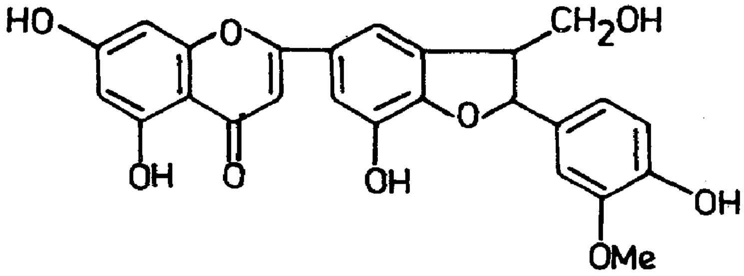
H. pentandra (Buch.-Ham.) Oken syn. *H. laurifolia* (Dennst.) Sleummer, *H. wightiana* Blume (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 137).

Structure of a new flavono-lignan - hydnocarpin - isolated from seeds (*Tetrahedron Lett.* 1973, 3481); isohydnocarpin isolated from seed hulls and characterised (*Indian J. Chem.* 1974, *12*, 888); methoxyhydnocarpin along with apigenin, luteolin and chrysoeriol isolated from seed hulls (*Indian J. Chem.* 1974, *12*, 993).

NEW COMPOUNDS



Hydnocarpin
R = H
Methoxyhydnocarpin
R = OMe



Isohydnocarpin

H. venenata Gaertn. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 137).

β-Amyrin, betulinic acid, β-sitosterol, friedelin and ursolic acid isolated (*Phytochemistry* 1977, *16*, 788).

H. wightiana Blume; see *H. pentandra* (Buch.-Ham.) Oken

HYDRANGEA (Hydrangeaceae)

H. heteromalla D. Don syn. *H. vestita* Wall.

Daphnetin-8-methylether, umbelliferone, fraxetin, sitosterol and ursolic acid obtained from plant (*J. Indian Chem. Soc.* 1975, *52*, 1222).

Distribution : Temperate Himalayas from Bhutan to Kumaon, alt. 2500-3000 m, found frequently in Khasi Hills.

H. macrophylla (Thunb.) Ser. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 220).

Phyllodulcin estimated by TLC (*Yakugaku Zasshi* 1974, *94*, 1167; *Chem. Abstr.* 1974, *81*, 176085 t); p-aminophenyl-α-D-glucose isolated from leaves (*Phytochemistry* 1976, *15*, 55).

H. vestita Wall.; see *H. heteromalla* D. Don

HYDROCOTYLE (Apiaceae)

H. asiatica L.; see *Centella asiatica* (L.) Urba

HYGROPHILA (Acanthaceae)

H. auriculata (K. Schum.) Heine syn. *Asteracantha longifolia* (L.) Nees, *Hygrophila spinosa* T. Anders. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 220).

Detection of palmitic (7.2), stearic (0.8), oleic (11.9) and linoleic (80.1%) acids in seed oil (*Indian J. Pharm. Sci.* 1978, *40*, 119).

H. spinosa T. Anders.; see *H. auriculata* (K. Schum.) Heine

HYMENODICTYON (Rubiaceae)

H. excelsum (Roxb.) Wall. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 138).

Anthraquinones - rubiadin and its methyl ether, lucidin, nordamnacanthal, damnacanthal, 2-benzylxanthopurpurin, anthragallol, soranjidol and morindone - obtained from roots (*J. Chem. Soc.* C. 1971, 2001).

HYOSCYAMUS (Solanaceae)

H. muticus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 221).

BIOLOGICAL ACTIVITY

Scopolamine hydrobromide (0.5 mg/kg, i.p.) increased the activity of mice, but did not interfere with either learning or retention of the passive avoidance response (*Neuropharmacology* 1972, *11*, 347; *Chem. Abstr.* 1972, *77*, 83589 n); atropine sulphate inhibited insulin release induced by oral but not by i.v. glucose in human subjects (*Acta Endocrinol.* 1976, *83*, 772; *Chem. Abstr.* 1977, *86*, 37697 j).

H. niger L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 221).

Hyoscyamine-N-oxide isolated from roots, leaves and stems (*J. Pharm. Pharmacol.* 1973, *25*, 116); improved method of isolation of scopolamine from alkaloid mixture (Pol. 79,061 (1975) July, 14; *Chem. Abstr.* 1977, *86*, 55617 n); total alkaloids (0.13%) from aerial parts contained hyoscyamine, hyoscine, skimmianine, apohyoscine, apoatropine, tropine and α- and β-belladonines (*Khim. Prir. Soedin.* 1977, *13*, 126; *Chem. Abstr.* 1977, *87*, 50201 h); ratio of atropine and scopolamine in tropine alkaloids of leaf estimated as 2:1 (*Shoyakugaku Zasshi* 1978, *32*, 199; *Chem. Abstr.* 1979, *91*, 9405 x).

HYPERICUM (Hypericaceae)

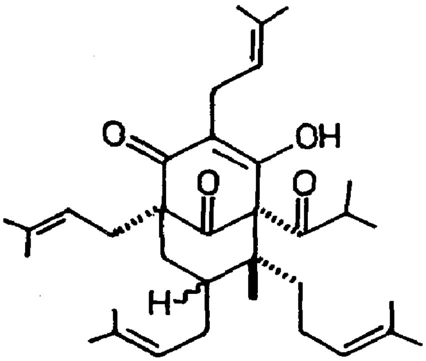
H. mysorense Wight & Arn.

2,3-Dimethoxyxanthone isolated from Sri Lanka plant (*Phytochemistry* 1979, *18*, 182).
Distribution : Western peninsula, Konkan to Pulney Hills, alt. 900-1500 m.

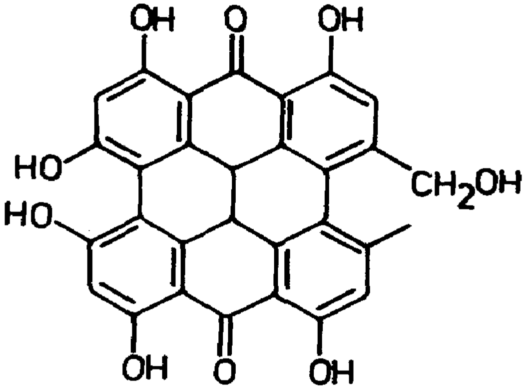
H. perforatum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 222).

Isolation of pseudohypericin and its structure elucidation (*Tetrahedron Lett.* 1974, 1991); hyperforin isolated and characterised (*Tetrahedron Lett.* 1975, 2791): eleven saturated straight chain C_{21-31} hydrocarbons detected in wax, C_{29} compound being major (83.0%) constituent (*Chem. Chron.* 1976, *5*, 329; *Chem. Abstr.* 1977, *86*, 136350 x).

NEW COMPOUNDS



Hyperforin



Pseudohypericin

BIOLOGICAL ACTIVITY

Hyperforin was active against gram - positive bacteria (*Tetrahedron Lett.* 1975, 2791).

HYPHAENE (Arecaceae)

H. thebaica Mart.

Eng. - Egyptian doum palm.

Aqueous extract of fruits stimulated contraction of frog heart and rat intestine but inhibited uterine contraction in rats; it decreased blood pressure in normontensive and hypertensive anaesthetised dogs by ganglionic blockade (*Qual. Plant. Mater. Veg.* 1972, *22*, 83; *Chem. Abstr.* 1973, *78*, 79858 c).

Distribution : Native of Egypt, grown in Indian gardens.

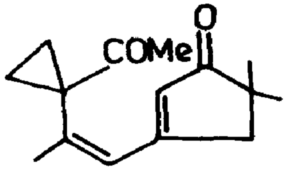
HYPOLEPIS (Hypolepidaceae)

H. punctata (Thunb.) Mett. ex Kuhn syn. *Dryopteris punctata* C. Chr. (excl. syn. *H. punctata* Bedd.)

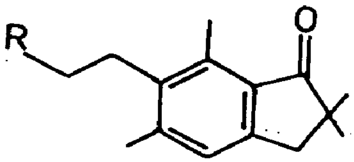
Hypolepins A, B and C isolated from leaves and their structures assigned (*Chem. Lett.* 1972, 375; *Chem. Abstr.* 1972, 77, 48650 d); isolation and structure elucidation of a seco-illudoid - hypacrone (*Chem. Lett.* 1973, 63; *Chem. Abstr.* 1973, *78*, 84560 d; *Tetrahedron* 1977, *33*, 2509); synthesis of hypacrone (*Tetrahedron* 1977, *33*, 2513).

Distribution : Mountainous regions of India, Himachal Pradesh to Bhutan and south India.

NEW COMPOUNDS



Hypacrone



Hypolepin A
R = Cl
Hypolepin B
R = OH
Hypolepin C
R = OMe

HYPOPITYS (HYPOPITHYS) (Monotropaceae)

H. lanuginosa Nutt.; see *Monotropa hypopitys* L.

HYPOXIS (Hypoxidaceae)

H. orchioides Kurz; see *Curculigo orchioides* Gaertn.

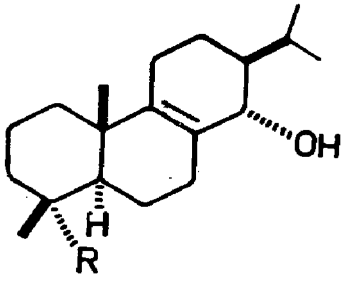
HYPTIS (Lamiaceae)

H. suaveolens (L.) Poit. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 139).

Alcoholic extract of leaves at 125 mg/kg showed 100% antifertility effect in female rats (*Indian J. Med. Res.* 1976, *64*, 1133).

Isolation and structure determination of two new diterpenes - suaveolic acid and suaveolol (*J. Org. Chem.* 1974, *39*, 2306).

NEW COMPOUNDS



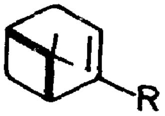
Suaveolic acid
R = COOH
Suaveolol
R = CH_2OH

HYSSOPUS (Lamiaceae)

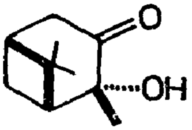
H. officinalis L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 139).

Myrtenol methyl ether, methyl myrtenate, cis-pinic acid, (+)2-hydroxyisopinocamphone, cis-pinonic acid along with β-pinene, pinocamphone and isopinocamphone isolated from essential oil; fourteen unidentified compounds also isolated (*Riv. Ital. Essenze, Profumi, Piante Offic. Aromi, Saponi Cosmet. Aerosol* 1976, *58*, 479; *Chem. Abstr.* 1977, *86*, 95852 s).

NEW COMPOUNDS



Myrtenol methyl ether
R = CH_2OMe
Methyl myrtenate
R = COOMe



(+)2-Hydroxyisopinocamphone

IBERIS (Brassicaceae)

I. amara L. syn. I. *coronana* Hort. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 222).

Eight flavonoid glycosides isolated from fruits, four of which identified as kaempferol-3-arabino-7-rhamnoside, mp. 224°, -3-gluco-7-rhamnoside, mp. 257° and -7-rhamnoside, mp. 218° and quercetin-3-gluco-7-rhamnoside, mp. 188° (*Planta Med.* 1971, *20*, 328); 3-methylthiopropylamine and (R)3-methylsulfinylpropylamine isolated; configuration of latter established (*Phytochemistry* 1977, *16*, 931); cucurbitacins E and I isolated (*Phytochemistry* 1977, *16*, 1519).

BIOLOGICAL ACTIVITY

Cucurbitacins E and I acted as feeding inhibitors for flea beetle (Phyllotreta nemorum) (*Phytochemistry* 1977, *16*, 1519).

I. coronaria Hort.; see *I. amara* L.

ILEX (Aquifoliaceae)

I. aquifolium L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 139).

Cholesterol, 24-methylcholesterol, 24-ethylcholesterol and 24-ethyl-5,22-cholestadien-3β-ol isolated from flowers (*Phytochemistry* 1977, *16*, 139); uvaol, erythrodiol, bauerenol, β-sitosterol, ergosterol, stigmasterol, campesterol, myristic, pentadecanoic, palmitic, heptadecanoic, stearic, oleic, linoleic, linolenic, arachidic, gadoleic, behenic and lignoceric acids isolated from leaves (*Planta Med.* 1978, *33*, 416).

ILLICUM (Illiciaceae)

I. anisatum L. syn. *I. religiosum* Sieb. & Zucc. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 223).

Fatty acids (C_{16} and C_{18}) and β-sitosterol isolated from seed oil (*Tokyo Gakugei Daigaku Kiyo, Dai-u-Bu* 1977, *29*, 116; *Chem. Abstr.* 1978, *89*, 20312 u).

I. religiosum Sieb. & Zucc.; see *I. anisatum* L.

IMPATIENS (Balsaminaceae)

I. balsamina L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 223).

β-Sitosterol from seeds (*J. Oil Technol. Assoc.* India 1973, *5*, 10; *Chem. Abstr.* 1973, *79*, 2744 a).

I. glandulifera Royle syn. *I. roylei* Walp.

2-Methoxy-1,4-naphthoquinone isolated from leaves (*Phytochemistry* 1974, *13*, 662).

Distribution : Himalayas, from Kashmir to Kumaon, alt. 1600-4300 m.

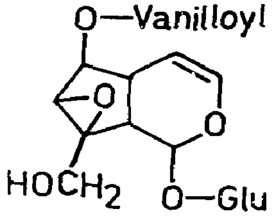
I. roylei Walp.; see *I. glandulifera* Royle

INCARVILLEA (Bignoniaceae)

I. emodi (Royle ex Lindl.) Chatterjee syn. *Amphicome emodi* Royle ex Lindl. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 16).

Isolation and structure of a new glycoside - amphicoside (*Tetrahedron Lett.* 1971, 2839).

NEW COMPOUNDS



Amphicoside

INDIGOFERA (Papilionaceae)

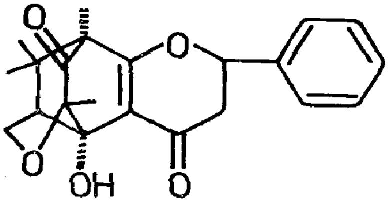
I. suffruticosa Mill.

H. - Vilayti nil; Eng. - West Indian indigo, Anil indigo; Tam.- Shimaiyaviri; Tel. - Shimanili; Kan. - Shimenili.

Isolation and crystal structure of an unusual flavanone derivative - louisfieserone - from Mexican plant (*Tetrahedron Lett.* 1978, 429; *Planta Med.* 1978, *34*, 172); β-sitosterol and (+)pinitol isolated (*Planta Med.* 1978, *34*, 172).

Distribution : Native of tropical America and West Indies, introduced into India.

NEW COMPOUNDS



Louisfieserone

BIOLOGICAL ACTIVITY

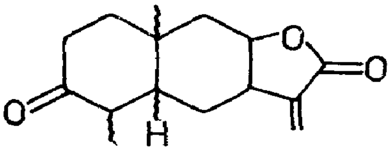
Louisfieserone showed antibiotic activity against gram +ve and -ve bacteria and inhibited sprouting and growth of seeds of dicotyledons (*Tetrahedron Lett.* 1978, 429).

INULA (Asteraceae)

I. graveolens Desf. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 141).

A new sesquiterpene lactone - graveolide - isolated and its structure elucidated (*Gazz. Chim. Ital.* 1973, *103*, 239; *Chem. Abstr.* 1973, *79*, 53614 r); ilicic acid isolated (*Fitoterapia* 1979, *50*, 3).

NEW COMPOUNDS

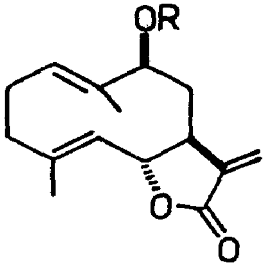


Graveolide

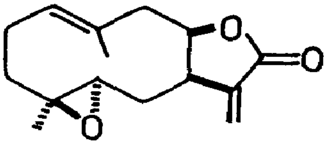
I. helenium L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 224).

Alantolactone, isoalantolactone, dihydroisoalantolactone and dihydroalantolactone isolated from roots and aerial parts (*Khim. Prir. Soedin.* 1974, *10*, 254; *Chem. Abstr.* 1974, *81*, 60894 b; *Khim. Prir. Soedin.* 1976, *12*, 820; *Chem. Abstr.* 1977, *86*, 136307 p; *Phytochemistry* 1978, *17*, 1165); scopoletin and umbelliferone isolated from aerial parts (*Khim. Prir. Soedin.* 1976, *12*, 820; *Chem. Abstr.* 1977, *86*, 136307 p); quercetin, its 3-methyl ether and quercetin-7-triglucoside isolated from inflorescence; quercetin-7-triglucoside assumed to be new compound (*Herba Pol.* 1978, *24*, 107; *Chem. Abstr.* 1979, *90*, 183169 n); 1-deoxy-8-epi-ivangustin, germacrene-D lactone, isohumulene and trideca-1-en-3,5,7,9,11-pentyne from roots; 2-oxoalantolactone, 8-epi-isoivangustin, 9β-hydroxycostunolide, 9β-isovaleryloxycostunolide, 9β-isobutyryloxycostunolide, 4β,5α-epoxy-4,5-cis-inunolide, 1β,10α,epoxy-[1,10H]-cis-inunolide, 4-epi-isoinuviscolide, 4α,5α-epoxy-10α,14H-inuviscolide, 4α-H-confertin and 8-epitomentosin (xanthinosin) isolated from aerial parts and characterised (*Phytochemistry* 1978, *17*, 1165).

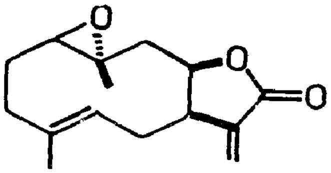
NEW COMPOUNDS



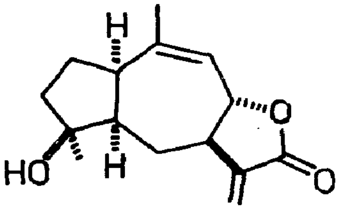
9β-Hydroxycostunolide
R = H
9β-Isovaleryloxycostunolide
R = Isovaleryl
9β-Isobutyryloxycostunolide
R = isobutyryl



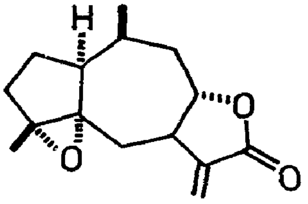
4β,5α-Epoxy-4,5-cis-inunolide



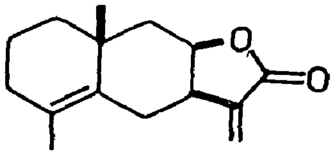
1β,10α-Epoxy-[1,10H]-cis-inunolide



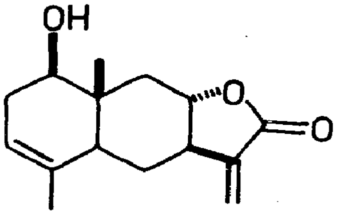
4-Epi-isoinuviscolide



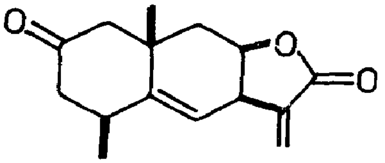
4α,5α-Epoxy-10α,14H-inuviscolide



1-Deoxy-8-epi-ivangustin



8-Epi-isoivangustin



2-Oxoalantolactone

I. racemosa Hook.f. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 225).

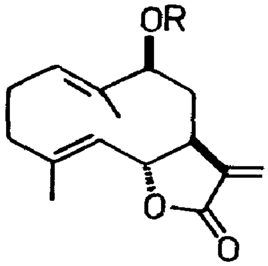
β-Sitosterol, octadecanoic acid and D-mannitol isolated (*J. Res. Indian Med.* 1974, *30*, 9).

I. royleana DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 225).

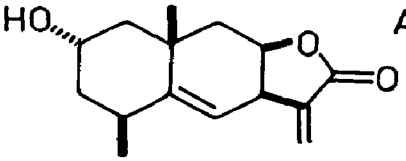
Eudesmol, elemol, farnesol, nerolidol, geraniol, borneol, α-terpineol, anisic alcohol, cineole, methylheptenone, citronellal, cinnamaldehyde, β-caryophyllene, β-elemene, γ-elemene, limonene, geranyl acetate, caryophyllene oxide, α-selinene, β-selinene, δ-cadinene and an unidentified compound, mp. 145°, isolated from root essential oil (*J. Indian Chem. Soc.* 1978, *55*, 476); alantolactone, isoalantolactone and trideca-1-ene-3,5,7,9,11-pentyne

isolated from roots; isoalantolactone, 2α-hydroxyalantolactone, ivalin acetate, 1-desoxy-8-epi-ivangustin, 8-epi-ivangustin, 8-epi-iso-ivangustin, 9β-hydroxycostunolide, 9β-propionyloxycostunolide, 9β-(2-methylbutyryloxy)-costunolide, 4β,5α-epoxy-4,5-cis-inunolide, 4α,5α-epoxy-10,14H-inuviscolide, 4H-tomentosin, 4H-carabrone, 4-epi-isoinuviscolide and 2-oxo-alantolactone isolated from aerial parts and characterised (*Phytochemistry* 1978, *17*, 1165).

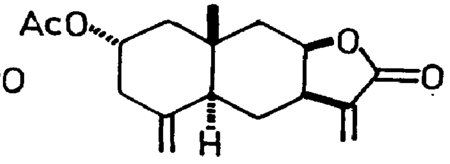
NEW COMPOUNDS



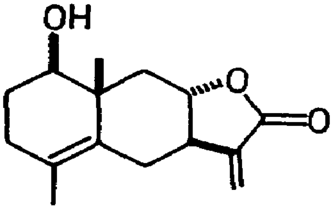
9β-Propionyloxycostunolide
R = Propionyl
9β-(2-Methylbutyryloxy)-costunolide
R = 2-Methylbutyryl



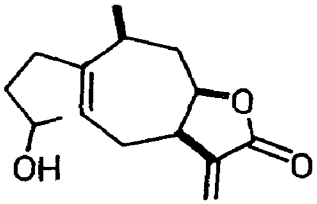
2α-Hydroxyalantolactone



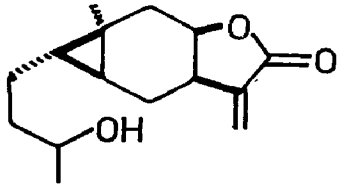
Ivalin acetate



8-Epi-ivangustin



4H-Tomentosin



4H-Carabrone

IPHIGENIA (Liliaceae)

I. indica (L.) Kunth

Tam.- Nirpanai; Santal - Chutia- chandbol.

Identity of bechuanine with (S)floramultine established (*Collect. Czech. Chem. Commun.* 1973, *38*, 1712).

Distribution : Throughout India, ascending to 2000 m in hills.

I. pallida Baker

Identity of bechuanine with (S)floramultine established (*Collect. Czech. Chem. Commun.* 1973, *38*, 1712).

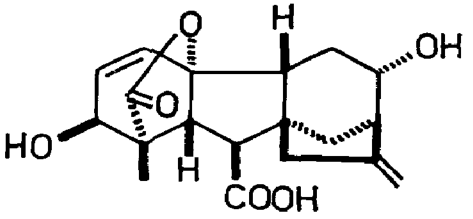
Distribution : South-west India, mostly in Western Ghats.

IPOMOEA (Convolvulaceae)

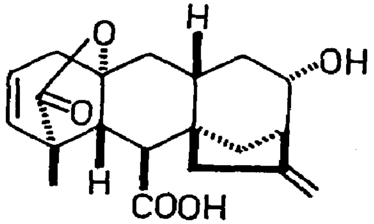
I. alba L. syn. *Calonyction aculeatum* (L.) House, *I. bona-nox* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 226).

Fourteen gibberellin-type substances isolated from immature seeds, five identified as GA_8, GA_{17}, GA_{19}, GA_{27} and GA_{29}; of remaining new gibberellins, GA_{30}, GA_{31}, GA_{33}, GA_{34} characterised as ent-3α,10,12β-trihydroxy-20-norgibberella-1,16-dien-7,9-dioic acid-19,10-lactone, ent-10,12β-dihydroxy-20-norgibberella-2,16-dien-7,19-dioic acid-19,10-lactone, ent-1α,10,12β-trihydroxy-3-keto-20-norgibberella-16-en-7,9-dioic acid-19,10-lactone and ent-2α,3α,10-trihydroxy-20-norgibberella-16-en-7,9-dioic acid-19,10-lactone respectively (*Plant Growth Subst. Proc. Int. Conf.* 7th, 1970, 175; *Chem. Abstr.* 1973, *79*, 50721 n); two kauranoic acids (I and II)isolated from immature seeds and characterised (*Tetrahedron Lett.* 1973, 789).

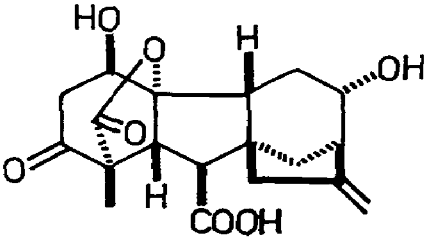
NEW COMPOUNDS



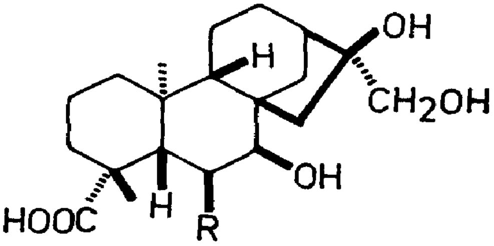
Gibberellin A_{30}



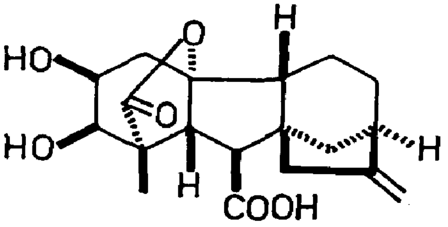
Gibberellin A_{31}



Gibberellin A_{33}



Kauranoic acid I
R = OH
Kauranoic acid II
R = H



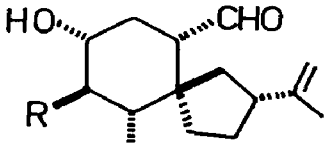
Gibberellin A_{34}

I. batatas Lam. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 141).

A new furanoterpenoid - dehydroipomeamarone - isolated from roots infected with *Ceratocystis fimbriata* (*Phytochemistry* 1974, *13*, 521); n-pentacosane, n-heptacosane, n-non-

acosane, β-sitosterol, palmitic acid and NaCl isolated along with three unknown compounds - A, B and C with mp. 220°, 194° and 133° respectively (*Chung-Kuo Nung Yeh Hua Hsueh Hui Chih* 1977, *15*, 78; *Chem. Abstr.* 1977, *87*, 130525 g); lubimin and oxylubimin isolated from diseased tubers and their structures elucidated (*Bull. Chem. Soc.* Jpn. 1977, *50*, 1271).

NEW COMPOUNDS



Lubimin
R = H
Oxylubimin
R = OH

I. biloba Hook.f.; see *I. pes-caprae* (L.) R. Br. ssp. *pes-caprae*

I. bona-nox L.; see *I. alba* L.

I. carnea Jacq.; see *I. carnea* Jacq. ssp. *fistulosa* (Mart. ex Choisy) D. Astin

I. carnea Jacq. ssp. *fistulosa* (Mart. ex Choisy) D. Austin syn. *I. carnea* sensu Parker (non Jacq.), *I. fistulosa* Mart. ex Choisy (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 226)

Non-alkaloidal fraction from leaves showed sedative, hypnotic, central depressant and muscle-relaxant activities in rats and mice (*Indian J. Pharmacol.* 1975, *7*, 31).

Ergoline and clavine alkaloids present in seeds; total alkaloids estimated (0.006%) (*Indian J. Pharm.* 1974, *36*, 44); β-sitosterol isolated from leaves (*J. Indian Chem. Soc.* 1979, *56*, 326); a new galactomannan isolated from seeds composed of galactose and mannose in ratio of 3:10 (*Carbohydr. Res.* 1979, *73*, 145; *Chem. Abstr.* 1979, *91*, 74811 r).

BIOLOGICAL ACTIVITY

A glycoside isolated from leaves caused an initial block of isolated frog heart followed by increase in both amplitude and rate which lasted for 2-3 min. It had no effect on rectus abdominus muscle and guinea pig intestinal smooth muscle (*Indian Drug Pharm. Ind.* 1978, *13*, 7; *Chem. Abstr.* 1979, *91*, 186684 h).

I. dichroa Choisy syn. *I. pilosa* (Roxb.) Sweet

Seeds did not contain alkaloids (*Indian J. Pharm.* 1974, *36*, 44).

Distribution : Western Himalayas, foothills, alt. 300-1000 m.

I. digitata L.; see *I. paniculata* (L.) R. Br.

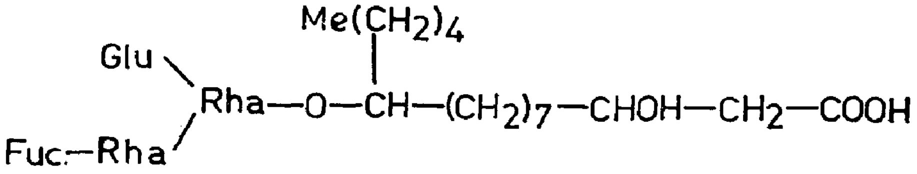
I. fistulosa Mart. ex Choisy; see *I. carnea* Jacq. ssp. *fistulosa* (Mart. ex Choisy) D. Austin

I. indica (Burm.f.) Merrill syn. *I. leari* Paxt.

A new glycoside - ipolearoside - isolated; composed of 3,11-dihydroxyhexadecanoic acid, glucose, rhamnose and fucose (*Phytochemistry* 1973, *12*, 2461).

Distribution : An American species, cultivated and naturalised in tropical and temperate hilly regions of India.

NEW COMPOUNDS



Ipolearoside

BIOLOGICAL ACTIVITY

Ipolearoside showed anticancer activity in WM system (*Phytochemistry* 1973, *12*, 2461).

I. leari Paxt.; see *I. indica* (Burm.f.) Merrill

I. muricata (L.) Jacq.; see *I. turbinata* Lag.

I. paniculata (L.) R. Br. syn. *I. digitata* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 226).

Extract produced relaxant effect on blood vessels and smooth muscles of guinea pigs, rats and frogs. This action together with depressant effect on myocardium, may account for hypotensive action of drug (*Indian J. Med. Sci.* 1969, *23*, 429).

Taraxerol and sitosterol isolated (*Phytochemistry* 1972, *11*, 2621).

I. pentaphylla (L.) Jacq.; see *Merremia aegyptia* (L.) Urban

I. pes-caprae (L.) R. Br. ssp. *pes-caprae* syn. *I. biloba* sensu Hook.f. p.p. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 142).

Seed extract showed presence of ergoline and clavine alkaloids; total alkaloids 0.009% (*Indian J. Pharm.* 1974, *36*, 44); malic, citric, maleic, tartaric, succinic and fumaric acids isolated from leaves (*Sakyu Kenkyu* 1978, *24*, 49; *Chem. Abstr.* 1978, *89*, 39447 p).

I. pes-tigridis L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 142).

Seeds showed presence of ergoline and clavine alkaloids; total alkaloids 0.0025% (*Indian J. Pharm.* 1974, *36*, 44).

I. pilosa (Roxb.) Sweet; see *I. dichroa* Choisy

I. purga Hayne; see *Exogonium purga* Benth.

I. purpurea (L.) Roth (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 227).

A new glycoside - ipopurpuroside - isolated and shown to consist of glucose, rhamnose and 6-deoxy-D-glucose glycosidically linked to ricinoleic methyl butyrate (*Phytochemistry* 1978, *17*, 451).

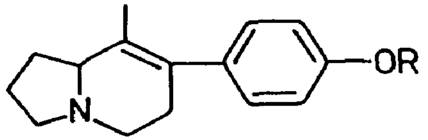
I. quamoclit L. syn. *Quamoclit pinnata* (Desr.) Bojer (*pennata*) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 208).

Total alkaloids in seeds 0.012% (*Indian J. Pharm.* 1974, *36*, 44).

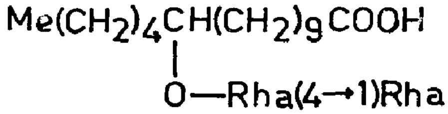
I. turbinata Lag. syn. *I. muricata* (L.) Jacq., *Calonyction muricatum* (L.) G. Don (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 227).

Total alkaloids in seeds estimated (0.0192%); ergoline and clavine bases found to be present (*Indian J. Pharm.* 1974, *36*, 44); new alkaloid - ipomine - isolated from seeds and its structure proposed (*Tetrahedron* 1977, *33*, 1733); structure of ipomine revised to 1β-ipalbidinyl-(6′-O-p-coumaroyl)-β-D-glucopyranoside (*Planta Med.* 1978, *34*, 93); revised structure of muricatin B established by its synthesis (*Phytochemistry* 1978, *17*, 997); palmitic, palmitoleic, stearic, oleic, linoleic acids, lysine, histidine, threonine, valine, leucine and isoleucine detected by GLC in seed oil (*J. Oil Technol. Assoc.* India 1978, *10*, 130; *Chem. Abstr.* 1979, *90*, 83652 w).

NEW COMPOUNDS



Ipomine
R = Glu(6′-p-coumaroyl)



Muricatin B

I. turpethum (L.) R. Br.; see *Operculina turpethum* (L.) Silva Manso

I. uniflora (Burm.f.) Roem. & Schult.; see *Aniseia martinicensis* (Jacq.) Choisy

IRIS (Iridaceae)

I. ensata Thunb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 143).

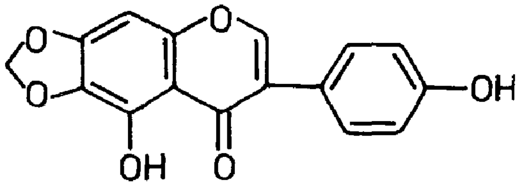
Ceryl alcohol isolated from roots (*Indian J. Chem.* 1976, *14*B, 475); 4′,7-dimethoxyapigenin-6C-β-D-glucopyranosyl-O-rhamnoside from aerial parts (*Khim. Prir. Soedin.* 1977, *13*, 166; *Chem. Abstr.* 1977, *87*, 50197 m).

I. germanica L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 143).

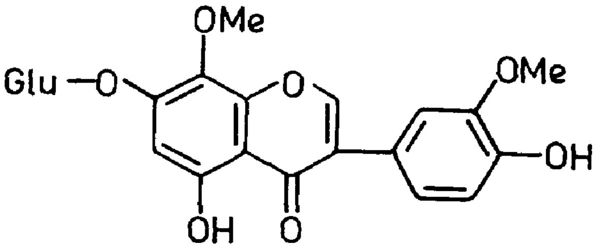
Irisolone (4′-hydroxy-5-methoxy-6,7-methylenedioxyisoflavone) isolated from rhizomes (*Phytochemistry* 1972, *11*, 3097; *Monatsh. Chem.* 1973, *104*, 1394; *Chem. Abstr.* 1974, *80*, 36956 g); a new isoflavone - irilone, mp. 231° - isolated from rhizomes (*Phytochemistry* 1973, *12*, 734); a new isoflavone glucoside - homotectoridin - together with tectoridin isolated from rhizomes and its structure elucidated (*Agric. Biol. Chem.* 1973, *37*, 145; *Chem. Abstr.* 1973, *78*,

136595 r); five isoflavones (I,II,III,IV and V) isolated from rhizomes together with acetovanillone, irisolidone, irigenin, tectorigenin and dihydroquercetin-3′,7-dimethyl ether (*Monatsh. Chem.* 1973, *104*, 1394; *Chem. Abstr.* 1974, *80*, 36956 g); 2,4,6,4′-tetrahydrobenzophenone isolated (*Phytochemistry* 1974, *13*, 2894).

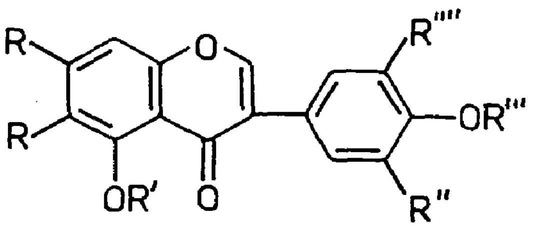
NEW COMPOUNDS



Irilone



Homotectoridin



I

R,R = -OCH_2O-, R′,R‴ = Me,

R″,R⁗ = OMe

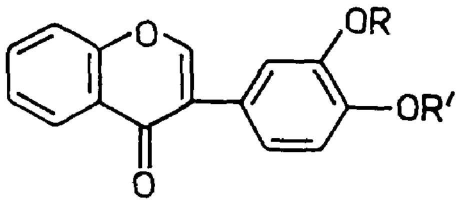
II

R,R = -OCH_2O-, R′,R‴ = Me,

R″ = H, R⁗ = OMe

III

R,R = -OCH_2O-, R′,R″,R‴,R⁗ = H



IV

R = H, R′ = Me

V

R = Me, R′ = H

I. kashmiriana Baker

Kash.- Mazar mond.

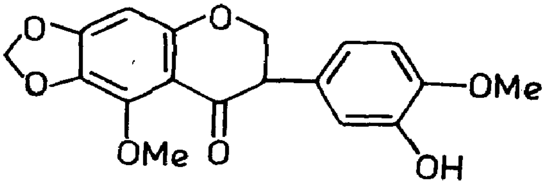
Irisolidone isolated (*J. Indian Chem. Soc.* 1975, *52*, 784).

Distribution : Kashmir, alt. 1700-1800 m.

I. kumaonensis Wall. ex G. Don (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 143).

Iridin [(7-glucosyloxy)-3′,5-dihydroxy-4′,5′,6-trimethoxyisoflavone] isolated (*Phytochemistry* 1972, *11*, 3097); a new isoflavone - iriskumaonin - isolated from acid hydrolysate of glycosidic mixture and its structure elucidated; iridin also isolated (*Phytochemistry* 1978, *17*, 1441).

NEW COMPOUNDS



Iriskumaonin

JACARANDA (Bignoniaceae)

J. acutifolia Humb. & Bonpl. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 228).

Scutellarein-7-glucuronide isolated (*Phytochemistry* 1972, *11*, 1499); β-sitosterol, ursolic acid and hentriacontane isolated from fruits (*Pakistan J. Sci. Ind. Res.* 1973, *16*, 178; *Chem. Abstr.* 1974, *81*, 10958 e); scutellarein, hydroxyquinone, mp. 171°, and a triterpenoid, mp. 257°, isolated from leaves (*Phytochemistry* 1973, *12*, 220); lupenone and β-sitosterol isolated from stem bark (*Indian J. Chem.* 1975, *13*, 869).

JACQUINIA (Theophrastaceae)

J. ruscifolia Jacq.

A compound, mp. 175°, and an unidentified glucoside isolated from seeds (*Bull. Calcutta School Trop. Med.* 1969, *17*, 51; *Chem. Abstr.* 1970, *73*, 127691 p).

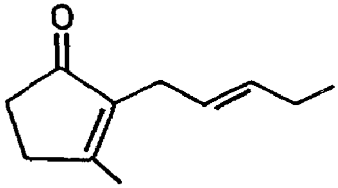
Distribution : Introduced into Indian gardens as ornamental.

JASMINUM (Oleaceae)

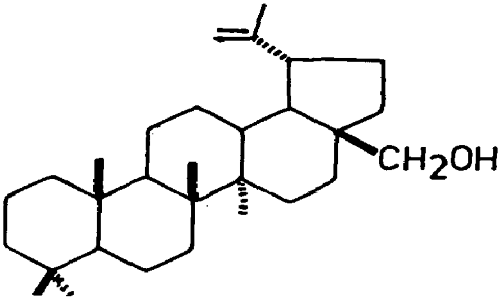
J. auriculatum Vahl (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 229).

Jasmone isolated from leaves (*Indian J. Appl. Chem.* 1970, *33*, 132; *Chem. Abstr.* 1971, *75*, 1299 q); jasminol isolated from leaves and characterised as lup-20-en-28β-ol (*Experientia* 1970, *26*, 10); C_{20}-C_{34} hydrocarbons (chiefly C_{29} and C_{31}), palmitic, stearic, linolenic, linoleic and malvalic acids, D-mannitol, inositol, xylitol and sorbitol isolated from leaves (*J. Appl. Chem. Biotechnol.* 1977, *27*, 55; *Chem. Abstr.* 1977, *87*, 18958 z); synthesis of jasminol (*Indian J. Chem.* 1978, *16*B, 416).

NEW COMPOUNDS



Jasmone



Jasminol

J. grandiflorum L. syn. *J. officinale* L. var. *grandiflorum* Bailey (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 229).

cis-3-Hexenol, 2-vinylpyridine, indole, myrcene, linalool, geranyl linalool, α-terpineol, geraniol, linalyl acetate, nerolidol, phytol, isophytol, farnesol, eugenol, benzyl alcohol, p-cresol, methyl benzoate, benzyl cyanide, benzyl acetate, methyl dihydrojasmonate, methyl anthranilate, cis-jasmone, methyl N-methylanthranilate, vanillin, cis-3-hexenyl benzoate, benzyl benzoate, methyl palmitate and methyl linoleate identified in flowers (*K'o Hsueh Fa Chan Yueh K'an* 1979, *7*, 140; *Chem. Abstr.* 1979, *90*, 200320 z).

J. odoratissimum L.

Eng.- Jasmine.

Cis-3-Hexenol, 2-vinylpyridine, indole, myrcene, linalool, geranyl linalool, α-terpineol, geraniol, linalyl acetate, nerolidol, phytol, isophytol, farnesol, eugenol, benzyl alcohol, p-cresol, methyl benzoate, benzyl cyanide, benzyl acetate, methyl dihydrojasmonate, methyl anthranilate, methyl N-methylanthranilate, vanillin, cis-3-hexenyl benzoate, benzyl benzoate, methyl palmitate and methyl linoleate identified in flowers (*K'o Hsueh Fa Chan Yueh K'an* 1979, *7*, 140; *Chem. Abstr.* 1979, *90*, 200320 z).

Distribution : Native of Madeira and Canary Islands, introduced into Indian gardens.

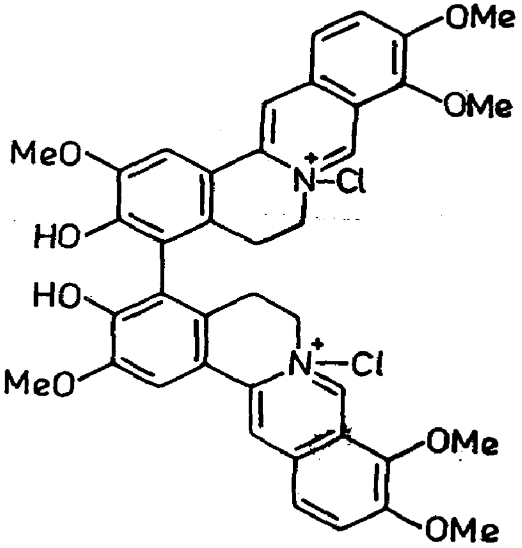
J. officinale L. var. *grandiflorum* Bailey; see *J. grandiflorum* L.

JATEORHIZA (Menispermaceae)

J. palmata (Lamk.) Miers (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 230).

A new protoberberine alkaloid - bisjatrorrhizine - isolated from roots and structure determined (*J. Chem. Soc.* C 1972, 327).

NEW COMPOUNDS



Bisjatrorrhizine

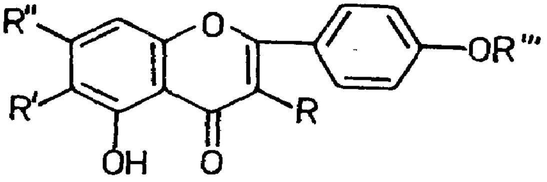
JATROPHA (Euphorbiaceae)

J. curcas L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 230).

Alcoholic extract of leaves and twigs showed activity both *in vivo* and *in vitro* against P-388 lymphocytic leukaemia (*Lloydia* 1978, *41*, 161).

Vitexin and isovitexin isolated from leaves (*Phytochemistry* 1971, *10*, 2548); palmitic (21.8), oleic (41.0) and linoleic acids (27.2%) determined in seed fat (*J. Oil Technol. Assoc.* India 1973, *5*, 8; *Chem. Abstr.* 1973, *78*, 156602 u); two new flavonoid glycosides I and II along with stigmasterol and β-sitosterol isolated from leaves (*Planta Med.* 1977, *31*, 274); β-sitosterol-β-D-glucoside, 7-keto-β-sitosterol, stigmasterol, stigmast-5-en-3β,7α-diol, stigmast-5-en-3β,7β-diol, campesterol and 1-triacontanol isolated (*Lloydia* 1978, *41*, 161).

NEW COMPOUNDS



I

R,R''' = H, R',R'' = Glu

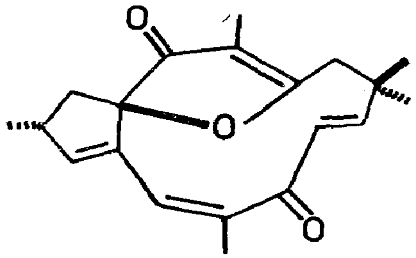
II

R,R'',R''' = Rha, R' = H

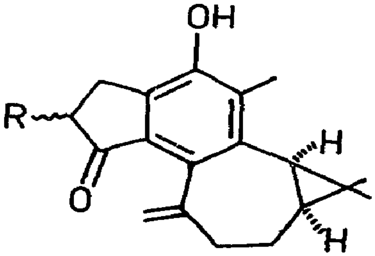
J. gossypifolia L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 145).

Stereostructure of a new macrocyclic diterpenoid - jatrophone - isolated from roots (*J. Am. Chem. Soc.* 1970, *92*, 4476; *ibid.* 1976, *98*, 2295); vitexin, isovitexin and apigenin isolated from leaves (*Phytochemistry* 1971, *10*, 1690); jatropholones A and B isolated from roots and their structures determined (*Tetrahedron Lett.* 1979, 979).

NEW COMPOUNDS



Jatrophone



Jatropholone A

R = β-Me

Jatropholone B

R = α-Me

J. heterophylla Heyne ex Hook.f.; see *J. heynei* Balak.

J. heynei Balak. syn. *J. heterophylla* Heyne ex Hook.f. (non Steud.)

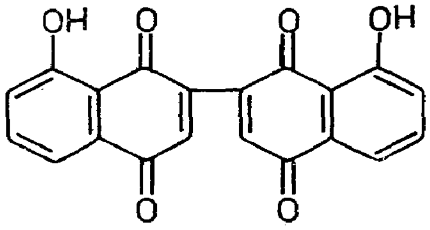
β-Sitosterol, vitexin and isovitexin isolated from aerial parts *(Curr. Sci.* 1975, *44*, 721).
Distribution : Peninsular India, Andhra Pradesh southwards.

JUGLANS (Juglandaceae)

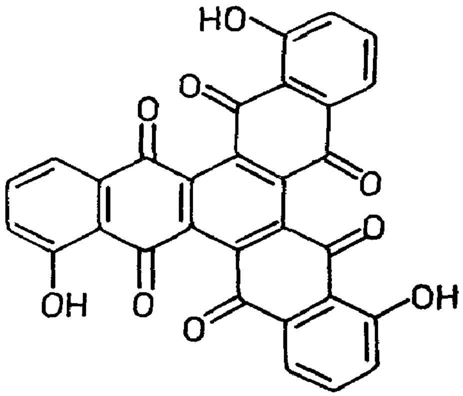
J. regia L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 231).

Berberine (0.08%) isolated from stem bark (*Nat. Appl. Sci. Bull.* 1974, *26*, 31; *Chem. Abstr.* 1976, *85*, 90192 w); cyclotrisjuglone isolated from roots along with β-sitosterol and juglone (*Indian J. Chem.* 1975, *13*, 749); structure elucidation of 3,3'-bisjuglone isolated from root bark (*Phytochemistry* 1978, *17*, 2042); C_{15}-C_{35} alkanes estimated (0.0036%) in bark by GC; ratio of odd homologous to even homologous alkanes determined as 1.86 (*Collect.Czech. Chem. Commun.* 1978, *43*, 320).

NEW COMPOUNDS



3,3'-Bisjuglone



Cyclotrisjuglone

JUNCELLUS (Cyperaceae)

J. serotinus Clarke; see *Cyperus serotinus* Rottb.

JUNIPERUS (Cupressaceae)

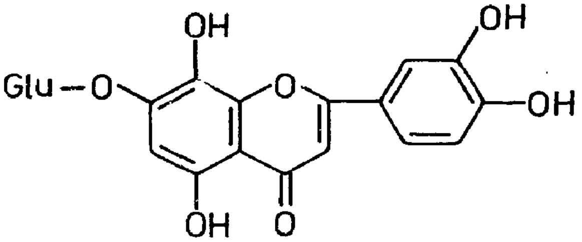
J. macropoda Boiss.; see *J. polycarpos* C. Koch

J. polycarpos C. Koch syn. *J. macropoda* auct. (non Boiss.) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 146).

Hypolactin-7-glucoside isolated from berries (*Phytochemistry* 1971, *10*, 434); essential oil (1.8%) from leaves contained camphene (4.47), sabinene (64.19%), α- and β-pinenes and cadinene (*Riechst. Aromen Koerperpflegem* 1973, 23, 146, 149; *Chem. Abstr.* 1973, *79*, 45631 d); three biflavones - amentoflavone, hinokiflavone and isocryptomerin - along with quercetagetin-3-O-α-L-rhamnoside, quercetin-3-O-α-L-rhamnoside and kaempferol-3-O-β-D-

glucoside isolated from leaves (*Phytochemistry* 1977, *16*, 1456; *Indian J. Chem.* 1979, *17*B, 193); cupressuflavone and podocarpusflavone A isolated from leaves (*Indian J. Chem.* 1979, *17*B, 193).

NEW COMPOUNDS



Hypolactin-7-glucoside

J. recurva Buch.-Ham. ex D. Don (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 146).

Sciadopitysin (7,7''-di-O-methylcupressuflavone) isolated from leaves (*Phytochemistry* 1973, *12*, 1494); two insecticidal constituents - thujopsene and cedr-8-en-13-ol - isolated from heartwood (*Agric. Biol. Chem.* 1977, *41*, 201; *Chem. Abstr.* 1977, *86*, 15624 w).

J. recurva Buch.-Ham. ex D. Don var. *squamata* (Buch.-Ham. ex D. Don) Parl.; see *J. squamata* Buch.-Ham. ex D. Don

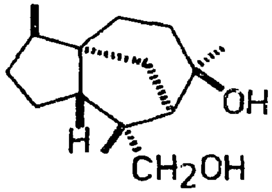
J. squamata Buch.-Ham. ex D. Don syn. *J. recurva* Buch.-Ham. ex D. Don var. *squamata* (Buch.-Ham. ex D. Don) Parl.

Garhwal & Himachal - Phulu, Thelu, Bhedara, Wetyar; Nep. - Tupi; Sikkim - Chukboo; Eng.- Weeping blue juniper.

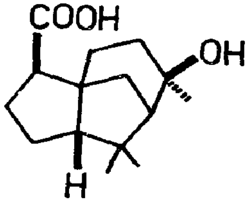
Isocedrolic acid isolated (*Experientia* 1976, *32*, 827); isolation of epicedranediol from wood and its characterisation (*J. Chinese Chem. Soc.* 1977, *24*, 141; *Chem. Abstr.* 1978, *88*, 85984 p).

Distribution : Throughout Himalayas, alt. 3300-4400 m.

NEW COMPOUNDS



Epicedranediol



Isocedrolic acid

JUSTICIA (Acanthaceae)

J. diffusa Willd. var. *prostrata* Clarke; see *J. prostata* (Clarke) Gamble

J. gendarussa Burm.; see *Gendarussa vulgaris* Nees

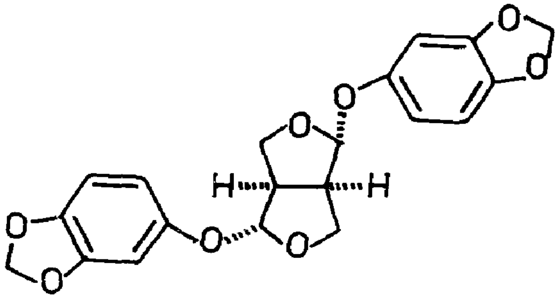
J. japonica Thunb. syn. *J. procumbens* L. var. *simplex* (D. Don) Yamazaki, *J. simplex* D. Don

H. - Onga.

Peonidin-3-gl coside isolated from flowers (*Vijnana Parishad Anusandhan Patrika* 1978, *21*, 177; *Chem. Abstr.* 1979, *90*, 183171 g); a new lignan - simplexolin - isolated and characterised along with sesamin, asarin, sesamolin and sitosterol (*Phytochemistry* 1979, *18*, 503).

Distribution : Throughout plains of India, ascending to 2000 m in hills.

NEW COMPOUNDS



Simplexolin

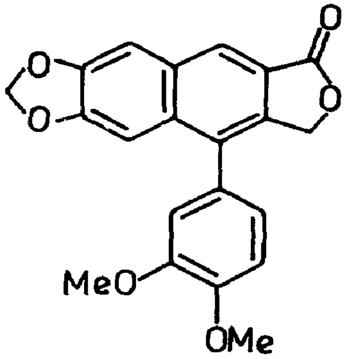
J. procumbens L. var. *simplex* (D. Don) Yamazaki; see *J. japonica* Thunb.

J. prostata (Clarke) Gamble syn. *J. diffusa* Willd. var. *prostrâta* Clarke

Isolation and synthesis of retrochinensin (*Chem. Commun.* 1979, 165).

Distribution : Deccan Peninsula.

NEW COMPOUNDS



Retrochinensin

J. simplex D. Don; see *J. japonica* Thunb.

J. trinervia Vahl

Stigmasterol isolated from roots (*Indian J. Chem.* 1977, *15*B, 291).

Distribution : Western Ghats.

KAEMPFERIA (Zingiberaceae)

K. rotunda L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 233).

Crotepoxide isolated from tubers (*Indian J. Chem.* 1970, *8*, 468).

KALANCHOE (Crassulaceae)

K. integra (Medik.) Kuntze syn. *K. spathulata* (Poir.) DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 147).

Leaf extract found toxic to rats, rabbits, dog and sheep; LD50 in mice and rat 230 and 560 mg/kg, i.p., respectively. It was nontoxic orally in doses upto 2 g/kg in mice and rat (*Indian J. Pharmacol.* 1979, *11*, 301).

Friedelin, taraxerol, glutinol, stigmasterol and campesterol isolated from flowers (*Phytochemistry* 1976, *15*, 1999).

K. pinnata Pers.; see *Bryophyllum pinnatum* (Lam.) Oken

K. spathulata (Poir.) DC.; see *K. integra* (Medik.) Kuntze

KALLSTROEMIA (Zygophyllaceae)

K. pubescens (G. Don) Dandy

Diosgenin content of whole plant and leaves determined as 1.0 and 1.8% respectively (*J. Inst. Chemists*, Calcutta 1976, *48*, 170; *Chem. Abstr.* 1977, *86*, 52710 b; *J. Inst. Chemists*, Calcutta 1978, *50*, 46; *Chem. Abstr.* 1978, *89*, 56459 m).

Distribution : West Bengal.

KIGELIA (Bignoniaceae)

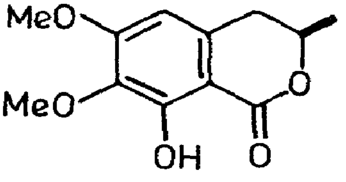
K. africana (Lamk.) Benth. syn. *K. pinnata* (Jacq.) DC.

Eng.- Common sausage tree; H. - Balamkhira.

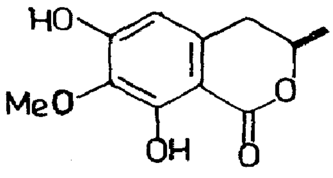
Two new dihydroisocoumarins (I and II) isolated along with stigmasterol, β-sitosterol, lapachol and 6-methoxymellein from roots and bark and their structures determined (*Phytochemistry* 1971, *10*, 1603).

Distribution : Grown in gardens and on roadside in plains of India.

NEW COMPOUNDS



I



II

K. pinnata (Jacq.) DC.; see *K. africana* (Lamk.) Benth.

KNEMA (Myristicaceae)

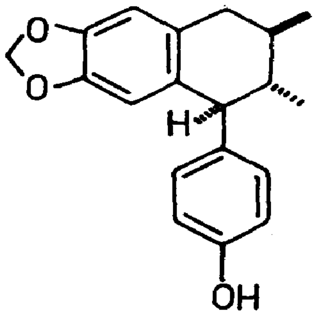
K. attenuata (Hook.f. & Thoms.) Warb. syn. *Myristica attenuata* Hook.f. & Thoms.

Tam. - Chora-pathiri; Kan. - Ruktmara, Hedaggal, Kaimara; Mal. - Chora panu, Chen-nelli; Bo. - Ragtrorar; Trade - Jathipai.

Stereostructure of a new lignan - attenuol - isolated from bark (*Experientia* 1978, *34*, 422).

Distribution : Western Ghats from Konkan southwards to Travancore upto alt. 1000 m.

NEW COMPOUNDS



Attenuol

KOCHIA (Chenopodiaceae)

K. scoparia (L.) Schard. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 235).

Harman and harmine isolated from aerial parts (*Lloydia* 1978, *41*, 289).

KOELPINIA (Asteraceae)

K. linearis Pall.

Cichoriin, mp. 215°, esculin and esculetin from leaves (*Khim. Prir. Soedin.* 1976, *12*, 537; *Chem. Abstr.* 1976, *85*, 174266 m).

Distribution : Punjab and Kashmir, alt. 600-4200 m.

LABLAB (Papilionaceae)

L. purpureus (L.) Sweet syn. *Dolichos lablab* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 236).

A biologically active substance obtained from immature seeds and identified as 3-O-β-D-glucopyranosyl gibberellin A_1 was much less active than gibberellin A_1 (*Agric. Biol. Chem.* 1978, *42*, 1811; *Chem. Abstr.* 1979, *90*, 19031 r).

LACTUCA (Asteraceae)

L. sativa L. syn. *L. scariola* L. var. *sativa* (L.) Clarke (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 148).

Campesterol, stigmasterol, sitosterol, 5-dehydro-avenasterol, stigmast-7-en-3β-ol and 7-dehydro-avenasterol isolated from seeds (*Phytochemistry* 1972, *11*, 1177); quercetin-3β-D-glucuronide, quercetin-3β-D-glucoside, quercetin-3-O-malonyl-β-D-glucoside and luteolin-7-β-D-glucuronide isolated (*Z. Naturforsch.* 1974, *29C*, 355; *Chem. Abstr.* 1974, *81*, 101829 e).

L. scariola L. var. *sativa* (L.) Clarke; see *L. sativa* L.

L. scariola L. syn. *L. serriola* L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 148).

A new sesquiterpene lactone - 8-deoxylactucin - along with lactupicrin, lactucin and jacquilenin isolated from rhizomes and characterised (*Rocz. Chem.* 1977, *51*, 2165; *Chem. Abstr.* 1978, *88*, 101565 k).

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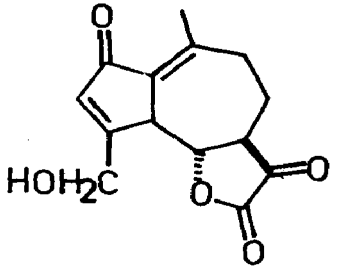

8-Deoxylactucin

L. serriola L.; see *L. scariola* L.

LAGASCEA (Asteraceae)

L. mollis Cav.

Patulitrin and acetylpatulitrin isolated from aerial parts (*J. Nat. Prod.* 1979, *42*, 126).

Distribution : Native of Central America, weed in plains of India.

LAGENARIA (Cucurbitaceae)

L. siceraria (Molina) Standl. syn. *L. vulgaris* Ser. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 237).

Palmitic (42.41), palmitoleic (0.81), stearic (6.7), oleic (9.67) and linoleic acids (40.42%) isolated from seed oil; rhamnose, fructose, glucose, galactose, sucrose, raffinose and stachyose isolated from seeds (*J. Inst. Chemists,* Calcutta 1978, *50*, 71).

L. vulgaris Ser.; see *L. siceraria* (Molina) Standl.

LAGERSTROEMIA (Lythraceae)

L. flosreginae Retz.; see *L. reginae* Roxb.

L. indica L. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 148).

A new alkaloid - lagerine - isolated, along with decamine, decinine, decodine, dehydroverticillatine, lagerstroemine and its structure elucidated (*J. Am. Chem. Soc.* 1971, *93*, 2958); sitosterol and 3,3′,4-tri-O-methylellagic acid isolated from roots (*Phytochemistry* 1972, *11*, 2890); delphinidin-3-arabinoside, petunidin-3-arabinoside and malvidin-3-arabinoside isolated from flowers in addition to gallic acid, methyl gallate and ellagic acid (*Phytochemistry* 1973, *12*, 2304); pageracetal, amyl alcohol and ellagic acid found in leaves (*Yakugaku Zasshi* 1974, *94*, 271; *Chem. Abstr.* 1974, *80*, 143057 m).

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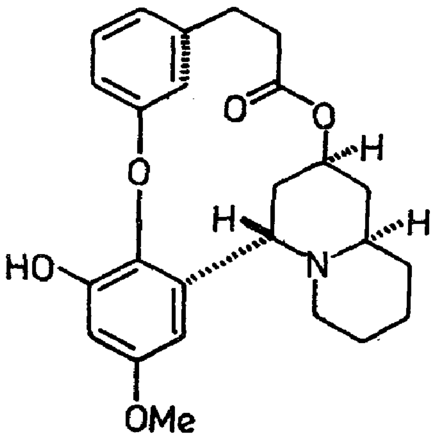

Lagerine

L. lanceolata Wall. ex W. & A.; see *L. microcarpa* Wight

L. microcarpa Wight syn. *L. lanceolata* Wall. ex W. & A.

Mar. - Nana; Tel. - Ventaku; Tam. - Vevala; Kan. - Benteak, Bilinandi, Bolundur; Mal. - Velillavu, Venthekku; Bo. - Bondara, Bodaga, Sukutya; Travancore. - Venda, Vengalam.

β-Sitosterol, oleanolic and ellagic acids isolated from leaves (*J. Indian Chem. Soc.* 1976, *53*, 1165).

Distribution : Maharashtra southwards to Kerala and hills of Deccan peninsula upto 1200 m.

L. reginae Roxb. syn. *L. speciosa* (L.) Pers., *L. flosreginae* Retz. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 237).

Lageracetal, amyl alcohol and ellagic acid isolated from leaves (*Yakugaku Zasshi* 1974, *94*, 271; *Chem. Abstr.* 1974, *80*, 143057 m); isolation of β-sitosterol and a new tannin - lagertannin - which was characterised as 3,4-di-O-methyl-4′-O-β-D-glucosylellagic acid (*Yakugaku Zasshi* 1976, *96*, 984; *Chem. Abstr.* 1976, *85*, 139771 a); 3,3′,4-tri-O-methylellagic acid and 3-O-methylellagic acid isolated from leaves (*Yakugaku Zasshi* 1977, *97*, 880; *Chem. Abstr.* 1977, *87*, 164237 e).

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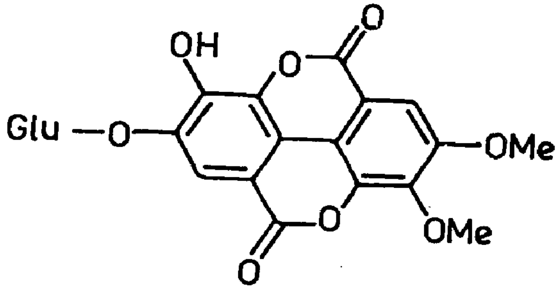

Lagertannin

L. speciosa (L.) Pers.; see *L. reginae* Roxb.

LAGGERA (Asteraceae)

L. aurita (Willd.) Sch.-Bip. ex Clarke

Mundari - Soanpuru.

Isolation and characterisation of new secondary alcohol - laggerol; in addition n-heptacosane, n-dotriacontane, δ-cadinene, α-cadinol and m-menth-6-en-8-ol isolated *(Indian J. Chem.* 1976, *14*, 64); isolation of an aromatic ether and its characterisation as 2,3-dimethoxy-p-cymene (I) (*Indian J. Chem.* 1976, *14*B, 711).

Distribution : Punjab eastwards to West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Kerala and Maharashtra.

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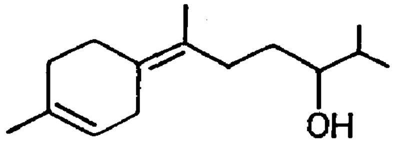
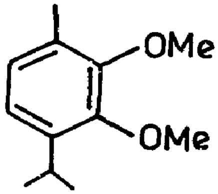


Laggerol



I

LAMIUM (Lamiaceae)

L. album L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 237).

A new iridoid glycoside - lamalbide - isolated from flowers and characterised (*Tetrahedron Lett.* 1973, 4037; *Acta Chem. Scand.* 1974, *28*B, 85); highest saponin content found in roots and flowers; three saponosides and four aglycones identified in flowers, caffeic acid in leaves and flowers and ferulic acid in stem and roots (*Contrib. Bot. Gradina Bot. Univ. Babes-Bolyai Cluj* 1977, 215; *Chem. Abstr.* 1978, *89*, 39380 m).

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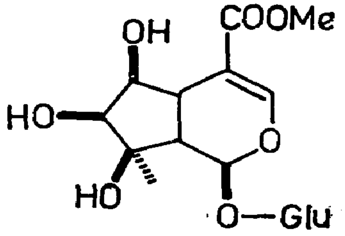

Lamalbide

L. amplexicaule L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 237).

Two new iridoid glucosides - ipolamiidoside and ipolamiide - isolated and their structures determined (*Gazz. Chim. Ital.* 1976, *106*, 947; *Chem. Abstr.* 1977, *86*, 155889 w).

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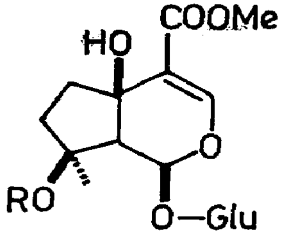


Ipolamiidoside
R = Ac
Ipolamiide
R = H

LANSIUM (Meliaceae)

L. anamalayanum Bedd.; see *Aglaia anamallayana* (Bedd.) Kosterm.

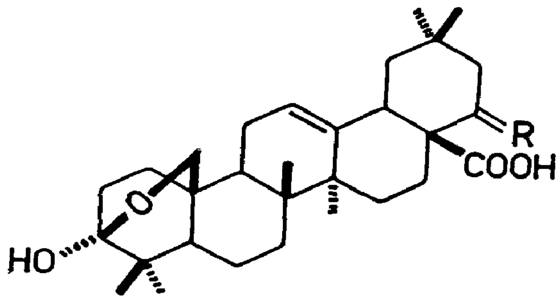
LANTANA (Verbenaceae)

L. camara L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 238).

Structure elucidation of lantanolic acid (*Tetrahedron*, 1971, *27*, 1141; *J. Indian Chem. Soc.* 1975, *52*, 1112); α--amyrin, β-sitosterol, lantadene and a triterpene acid, mp. 130°, obtained (*Planta Med.* 1972, *22*, 34); chemical studies on lantic acid (*J. Indian Chem. Soc.* 1972, *49*, 1063); lantadene A, lantadene B, lantalonic acid, lantic acid and ursonic acid from leaves (*J. Indian Chem. Soc.* 1973, *50*, 620); essential oil contained geraniol, linalool, cedrene, caryophyllene, farnesol, cis-nerolidol and trans-nerolidol (*Rev. Fac. Far. Odontol. Araraquara* 1975, *9*, 199; *Chem. Abstr.* 1977, *86*, 117583 j); lantanilic acid and its β,β-dimethylacryloyl ester isolated and stereostructure determined (*Phytochemistry* 1976, *15*, 987); taxa toxic to animals contained lantadenes A and B, their corresponding 3β-alcohols, 22β-hydroxy-3-oxo-olean-12-en-

28-oic acid along with oleanolic and oleanonic acids, whereas non-toxic taxa contained lantabetulinic acid (*Experientia* 1976, *32*, 412).

NEW COMPOUNDS



Lantanolic acid
R = H,H
Lantanilic acid
R = β-OCOCH = CMe_2,H

BIOLOGICAL ACTIVITY

In tests on sheep, lantadene B in 200-300 mg/kg dose given intraruminally was icterogenic and toxic; toxicity equivalent to that produced by 80 mg/kg of lantadene A and 40 mg/kg of its 3β-alcohol (*Experientia* 1976, *32*, 412).

L. indica Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 239).

Detection of carvomenthone, linalool, camphor, borneol, terpinen—4-ol, α-terpineol, methyl heptanoate and propyl butanoate in essential oil by GLC (*Rev. Ital. Essenze, Profumi, Piante Offic. Aromat. Syndets Saponi, Cosmet. Aerosols* 1979, *61*, 130; *Chem. Abstr*. 1979, *91*, 78751 u).

LASIOSIPHON (Thymelaeaceae)

L. eriocephalus (Meissn.) Decne.; see *Gnidia glauca* (Fresen.) Gilg. var. *glauca*

LASTREA (Dryopteridaceae)

L. filix-mas Presl var. *elongata* Bedd.; see *Dryopteris chrysocoma* (Christ) C. Chr. var. *chrysocoma*, *D. marginata* (Wall. ex Christ) Christ

LATHYRUS (Papilionaceae)

L. odoratus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 239).

Isolation and structure of 2-(2-cyanoethyl)-3-isoxazolin-5-one (I), 2-β-D-glucopyranosyl-3-isoxazolin-5-one and 2-carboxymethyl-3-isoxazolin-5-one (*Biochem. Biophys. Res. Commun.* 1974, *56*, 199; *Chem. Abstr.* 1974, *80*, 80075 t).

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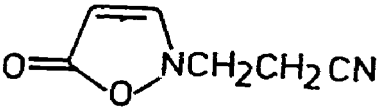

I

L. pratensis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 240).

Quercetin, luteolin and 5,7,3′,4′,5′-pentahydroxyflavone-3′-β-glucoside, mp. 282°, isolated (*Diss. Pharm. Pharmacol.* 1969, *21*, 553; *Chem. Abstr.* 1970, *73*, 32284 u).

L. sativa L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 150).

A new guanidino amine - homoagmatine - isolated from seedlings (*Phytochemistry* 1973, *12*, 2691); detection of cyanin and pelargonin by chromatography (*Curr. Sci.* 1977, *46*, 62).

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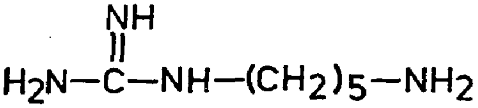

Homoagmatine

LAURUS (Lauraceae)

L. nobilis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 241).

A sesquiterpene lactone - laurenobiolide - isolated and its structure determined (*Chem. Commun.* 1971, 1391; *Chem. Pharm. Bull.* 1976, *24*, 667); rutin obtained from leaves (*Khim. Prir. Soedin.* 1971, *7*, 203; *Chem. Abstr.* 1971, *75*, 31312 f); a new monoterpene oxide - dehydro-1,8-cineole - isolated from essential oil (*Phytochemistry* 1974, *13*, 868); detection of α-thujene, β-pinene, 1,8-cineole, p-cymene, linalool, caryophyllene, α-terpineol and methyl eugenol in essential oil by GC; acetic, isobutyric and valeric acids and eugenol also identified (*Riv. Ital. Essenze, Profumi, Plante Offic. Aromat. Syndets, Saponi, Cosmet. Aerosols* 1978, *60*, 635; *Chem. Abstr.* 1979, *90*, 109789 y).

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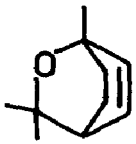
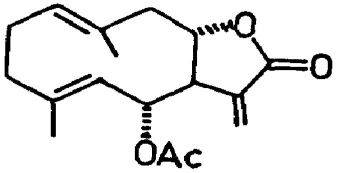


Dehydro-1,8-cineole



Laurenobiolide

LAVENDULA (Lamiaceae)

L. angustifolia Mill.; see *L. vera* DC.

L. officinalis Chaix.; see *L. vera* DC.

L. stoechas L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 242).

Lavanol and lavanyl acetate isolated (*Pakistan J. Sci. Ind. Res.* 1971, *14*, 488; *Chem. Abstr.* 1972, *77*, 72574 c).

L. vera DC. syn. *L. angustifolia* Mill., *L. officinalis* Chaix. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 242).

Estimation of ethyl amyl ketone, limonene, (+)cineole, linalool, its acetate, camphor and borneol by GC (*Rev. Real. Acad. Farm. Barcelona* 1972, 17; *Chem. Abstr.* 1973, *79*, 9752 k); umbelliferone and its methyl ether isolated from lavender oil (*Khim. Prir. Soedin.* 1977, *13*, 111; *Chem. Abstr.* 1977, *87*, 50192 f); monoterpenoids (I-VIII) identified in lavender oil (*Tetrahedron Lett.* 1977, 665).

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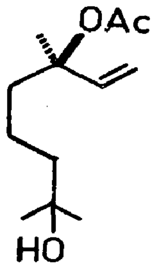

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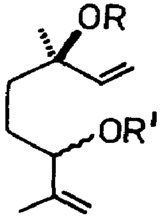
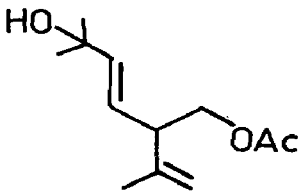


II

R = Ac, R′ = H

V

R = H, R′ = Ac



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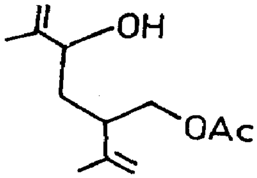

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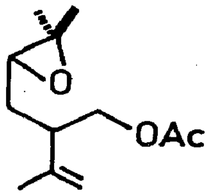

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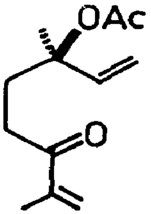

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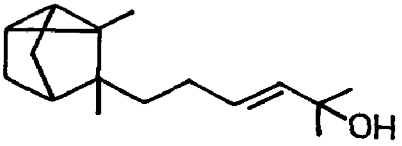


VIII

LAWSONIA (Lythraceae)

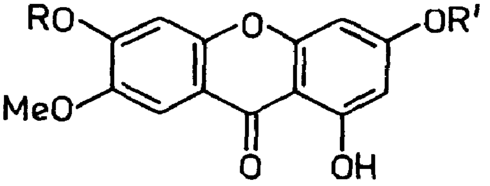
L. alba Lamk.; see *L. inermis* L.

L. inermis L. syn. *L. alba* Lamk. (*Glossary Indian Med Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 151).

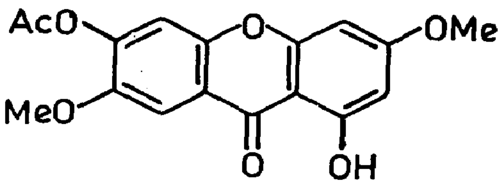
Pharmacognostic study of leaf, petiole and leaf powder (*J. Res. Indian Med.* 1971, *6*, 252).

Two new xanthones - laxanthones I and II - isolated and characterised as 1,3-dihydroxy-6,7-dimethoxyxanthone and 1-hydroxy-3,6-diacetoxy-7-methoxyxanthone respectively (*Phytochemistry* 1977, *16*, 1616); laxanthone III isolated and characterised as 1-hydroxy-3,7-dimethoxy-6-acetoxyxanthone (*Phytochemistry* 1978, *17*, 1440).

NEW COMPOUNDS



Laxanthone I
R = Me, R' = H
Laxanthone II
R,R' = Ac



Laxanthone III

LENS (Papilionaceae)

L. culinaris Medik. syn. *L. esculenta* Moench, *Ervum lens* L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 152).

Tricetin, luteolin, a diglycosyldelphinidin and two proanthocyanidins isolated from seed coat; kaempferol glycoside and 3,4',7-trihydroxyflavone isolated from cotyledons (*Phytochemistry* 1978, *17*, 826).

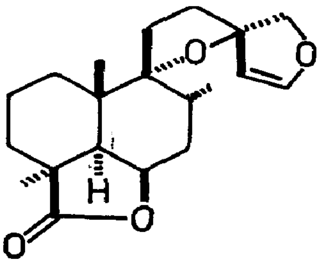
L. esculenta Moench; see *L. culinaris* Medik.

LEONOTIS (Lamiaceae)

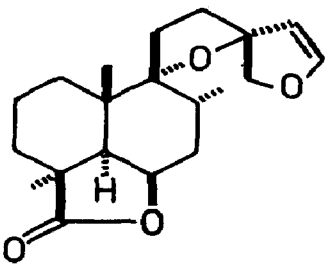
L. leonurus R. Br. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 242).

C-13 Epimeric premarrubiins I and II isolated and their stereostructures determined (*Gazz. Chim. Ital.* 1979, *109*, 145; *Chem. Abstr.* 1979, *91*, 211615 w).

NEW COMPOUNDS



Premarrubiin I

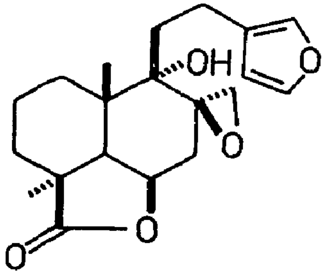


Premarrubiin II

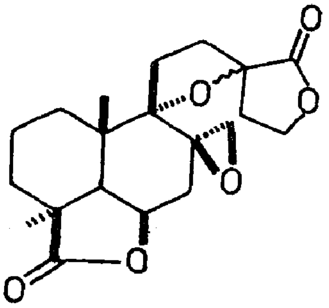
L. nepetaiefolia (L.) R. Br. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 152).

A labdane diterpene - nepetaefolin - isolated from leaves and its stereostructure determined (*J. Am. Chem. Soc.* 1970, *92*, 5527); methoxynepetaefolin isolated and characterised (*Tetrahedron Lett.* 1973, 1907); structure elucidation of nepetaefolinol and leonotinin; isolation and characterisation of a new labdane diterpenoid (I) as and characterised 8β,17:9,13-diepoxylabdane-16,15:19,6β-dilactone (*J. Chem. Soc.* Perkin 1 1974, 2661); a new coumarin isolated and its structure established as 4,6,7-trimethoxy-5-methylchromen-2-one (II) (*J. Chem. Soc.* Perkin 1 1976, 2594).

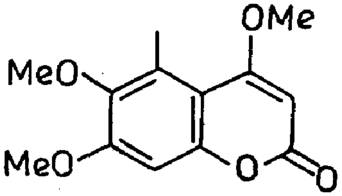
NEW COMPOUNDS



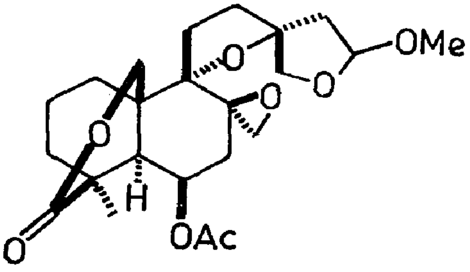
Leonotinin



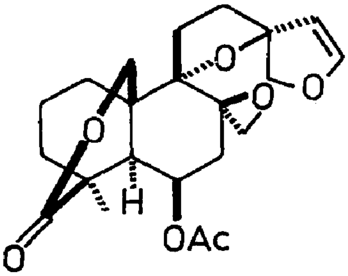
I



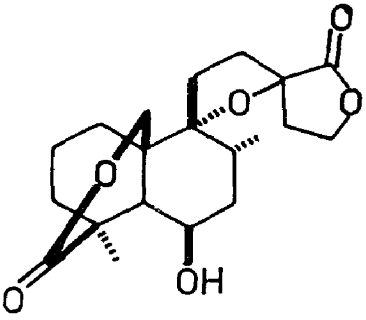
II



Methoxynepetaefolin



Nepetaefolin



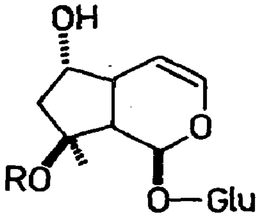
Nepetaefolinol

LEONURUS (Lamiaceae)

L. cardiaca L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 243).

New iridoid glucoside - leonuride - isolated and its structure established (*Ann. Chem.* 1973, 566); two out of four flavonoids isolated identified as 5,4′-dihydroxy-7-methoxyflavone and marrubiin (*Sci. Pharm.* 1973, *41*, 149; *Chem. Abstr.* 1973, *79*, 75882 d); two iridoid glucosides - ajugoside (leonuride) and ajugol - isolated and their structures assigned (*Gazz. Chim. Ital.* 1974, *104*, 25; *Chem. Abstr.* 1974, *81*, 132783 q).

NEW COMPOUNDS



Ajugoside
R = Ac
Ajugol
R = H

LEPIDIUM (Brassicaceae)

L. draba L.; see *Cardaria draba* L.

L. latifolium L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 53).

Kaempferol-3β-D-glucofuranosyl-6β-L-rhamnopyranoside, mp. 195°, quercetin-3β-D-glucofuranosyl-6β-L-rhamnopyranoside, mp. 229° and quercetin-3β-D-glucopyranoside identified (*Restit. Resur.* 1970, *6*, 567; *Chem. Abstr.* 1971, *74*, 95414 c).

L. perfoliatum L. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 152).

Quercetin-3β-D-glucoside and quercetin-7-L-rhamnoside identified in plant (*Farm. Zh.* 1970, *25*, 83; *Chem. Abstr.* 1971, *74*, 20349 b).

L. sativum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 243).

Alcoholic extractive of plant at 10-20 mg/kg, i.v., significantly increased blood pressure in anaesthetised cats and dogs. Hypertensive effect was completely blocked by 5 mg/kg of priscoline. Same dosage also increased rate and force of auricular and ventricular movements of open heart preparation. At 0.5-1.0 mg/ml showed cardiostimulant action on isolated rabbit auricle preparation. (*Indian J. Physiol. Pharmacol.* 1977, *21*, 118).

LEPISANTHES (Sapindaceae)

L. browniana Hiern; see *L. tetraphylla* (Vahl) Radlk.

L. cuneata Hiern; see *L. tetraphylla* (Vahl) Radlk.

L. montana Blume; see *L. tetraphylla* (Vahl) Radlk.

L. tetraphylla (Vahl) Radlk. syn. *L. montana* Blume, *L. browniana* Hiern, *L. cuneata* Hiern, *Hemigyrosa canescens* (Roxb.) Blume, *H. deficiens* Bedd., *H. longifolia* Hiern

Mar. - Kurpa; Tel. - Korivi; Tam. - Nekota, Karadipongan, Masamathi; Kan. - Kurpah, Mooltaga, Kaluyette; Oriya - Panikusum.

Stigmasterol isolated from roots and leaves (*Indian J. Chem.* 1977, *15B*, 291).

Distribution : Deccan Peninsula, ascending upto 900 m. Occasionally planted as roadside tree.

LEPTORHABDOS (Scrophulariaceae)

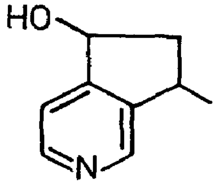
L. benthamiana Walp.; see *L. parviflora* (Benth.) Benth.

L. linifolia Walp.; see *L. parviflora* (Benth.) Benth.

L. parviflora (Benth.) Benth. syn. *L. benthamiana* Walp., *L. linifolia* Walp. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 244).

A new alkaloid - leptorhabine - isolated from aerial parts and its structure established (*Khim. Prir. Soedin.* 1974, *10*, 683; *Chem. Abstr.* 1975, *82*, 73262 q; *Khim. Prir. Soedin.* 1975, *11*, 269; *Chem. Abstr.* 1975, *83*, 111119 d); crystal structure of sophoridine (*Khim. Prir. Soedin.* 1978, *14*, 538; *Chem. Abstr.* 1979, *90*, 23357 u).

NEW COMPOUNDS



Leptorhabine

LESPEDEZA (Papilionaceae)

L. cuneata G. Don; see *L. juncea* (L.f.) Pers. var. *sericea* (Thunb.) Forbes & Hemsl.

L. juncea (L.f.) Pers. var. *sericea* (Thunb.) Forbes & Hemsl. syn. *L. sericea* (Thunb.)Miq., *L. cuneata* G.Don

H. - Khunju.

β-Sitosterol, succinic acid, triacontan-1-ol, quercetin, kaempferol, pinitol, avicularin, juglanin and trifolin identified (*Yakugaku Zasshi* 1978, *98*, 1542; *Chem. Abstr.* 1979, *90*, 51429 n).

Distribution : Foothills of Himalayas from Kashmir to Bengal upto 2400 m and in the Nilgiris and Pulney Hills upto 2100 m.

L. sericea (Thunb.)Miq.; see *L. juncea* (L.f.) Pers. var. *sericea* (Thunb.) Forbes & Hemsl.

LEUCAENA (Mimosaceae)

L. glauca (L.) Benth. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 244).

Crystal structure of mimosine (*Acta Chem. Scand.* 1974, *28*B, 249); kaempferol-3-arabinoside, kaempferol-3-xyloside, quercetin-3-arabinoside, quercetin-3-rhamnoside and quercetin-3-galactoside isolated from leaves (*Shoyakugaku Zasshi* 1977, *31*, 172; *Chem. Abstr.* 1978, *88*, 148947 b).

LEUCAS (Lamiaceae)

L. aspera (Willd.) Link (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 245).

Plant used as antipyretic; juice of leaves applied externally in psoriasis. Extract showed antibacterial activity against *Micrococcus pyogenes* and *Escherichia coli* (*Sci. Res.* 1970, *7*, 125; *Chem. Abstr.* 1973, *78*, 1974 t).

α-Sitosterol, β-sitosterol and a compound A, mp. 61°, isolated from aerial parts (*Sci. Res.* 1970, *7*, 125; *Chem. Abstr.* 1973, *78*, 1974 t).

L. cephalotus (Roth) Spreng. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 153).

β-Sitosterol glucoside isolated from plant (*Quart. J. Crude Drug Res.* 1969, *9*, 1453; *Chem. Abstr.* 1970, *72*, 82922 a); labellenic acid (octadeca-5,6-dienoic acid) content in seed oil 28% (*Chem. Ind.* 1978, 67).

LIGULARIA (Asteraceae)

L. thomsonii (Clarke) Pojark syn. *Senecio thomsonii* Clarke

Roots contained furoeremophilan-14β,6α-olide and a lactone, mp. 190° (*Khim. Prir. Soedin.* 1976, *12*, 742; *Chem. Abstr.* 1977, *86*, 103055 b).

Distribution : Kashmir, alt. 2100-3000 m.

LIGUSTRUM (Oleaceae)

L. lucidum Ait. syn. *L. nepalense* Wall. ex Roxb. var. *glabrum* Hook.f.

Fruits contained cyanidin-3-glucoside, cyanidin-3-rutinoside and malvidin-3-rutinoside-5-glucoside (*An. Assoc. Quim. Argent.* 1977, *65*, 59; *Chem. Abstr.* 1979, *90*, 19035 v).

Distribution : Grown in gardens.

L. neilgherrense Wight var. *obovata* Decne.

Tam. - Punganchedi, Koli; Mal. - Punnu.

D-Mannitol and kaempferitrin isolated from leaves (*Proc. Indian Acad. Sci.* 1977, *86*A, 41; *Chem. Abstr.* 1977, *87*, 148684 t).

Distribution : Nilgiris and Pulney Hills in south India.

L. nepalense Wall. ex Roxb. var. *glabrum* Hook.f.; see *L. lucidum* Ait.

L. vulgare L.

Fruits contained cyanidin-3-glucoside, cyanidin-3-rutinoside and malvidin-3-rutinoside-5-glucoside (*An. Assoc. Quim. Argent.* 1977, *65*, 59; *Chem. Abstr.* 1979, *90*, 19035 v).

Distribution : Grown in gardens.

LILIUM (Liliaceae)

L. candidum L.

Eng.- Madonna lily, Annunciation lily.

γ-Methyleneglutamic acid isolated from bulbs (*Phytochemistry* 1972, *11*, 859); stereochemistry of cis-antheraxanthin (*Acta Chim. Acad. Sci. Hung.* 1978, *97*, 359; *Chem. Abstr.* 1979, *90*, 39070 f).

Distribution : Occurs in south Europe and south-west Asia from Corsica to Caucasus Mountains and north Persia. In India grown in gardens as ornamental.

LIMNOPHILA (Scrophulariaceae)

L. roxburghii G.Don; see *L. rugosa* (Roth) Merrill

L. rugosa (Roth) Merrill syn. *L. roxburghii* sensu Hook.f. (non G. Don) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 154).

Detection of p-methoxybenzoic acid, anisaldehyde, anethole, estragole and unidentified substituted phenylpropane derivatives in essential oil of leaves by GLC (*Planta Med.* 1974, *25*, 253); methylchavicol (82.5), anisaldehyde (13.5%), formic, propionic, acetic and valeric acids and acetone found in essential oil (*Indian Perfum.* 1977, *22*, 135; *Chem. Abstr.* 1978, *79*, 220739 a).

LIMONIA (Rutaceae)

L. acidissima Wt. & Arn.; see *Naringi crenulata* (Roxb.) Nicolson

L. alata Wall. ex Wt. & Arn.; see *Naringi alata* (Wall. ex Wt. & Arn.) Ellis

L. crenulata Roxb.; see *Naringi crenulata* (Roxb.) Nicolson

L. spectabilis Lindl.; see *Ravenia spectabilis* Engl.

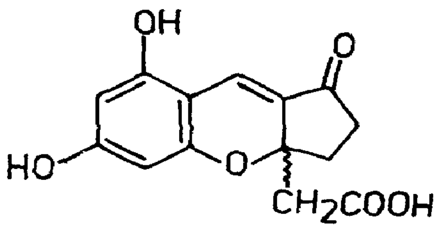
LINDSAEA (Lindsaeaceae)

L. ensifolia Sw. syn. *Schizoloma ensifolia* (Sw.) J. Smith

A chromene - lindseic acid - isolated from aerial parts together with vitexin and its structure established (*Chem. Pharm. Bull.* 1978, *26*, 2600).

Distribution : Hilly regions of India, upto 1200 m.

NEW COMPOUNDS



Lindseic acid

LINUM (Linaceae)

L. usitatissimum L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 154).

Cholesterol (2), campesterol (26), stigmasterol (7), sitosterol (41), 5-dehydro-avenasterol (13), cycloartenol (9) and 24-methylenecycloartanol (2%) in seeds characterised by GC-MS (*Phytochemistry* 1972, *11*, 1183).

LIPPIA (Verbenaceae)

L. citriodora H. B. & K.; see *Aloysia triphylla* (L' Herit.) Britton

L. geminata H. B. & K.; see *L. javanica* (Burm.f.) Spreng.

L. javanica (Burm.f.) Spreng. syn. *L. geminata* H. B. & K.

Eng.- Wild sage; Oriya - Naga-aieri; Mikir - Lopongbrik; Sylhet - Pichae-lakri, Pichas-bon; Mundari - Daru-kaini-ba; H.- Basula.

Stearic, palmitic, myristic, oleic, arachidic, behenic and lignoceric acids, n-nonacosane, n-triacontane, n-hentriacontane, n-dotriacontane, n-tritriacontane, n-tetratriacontane and n-pentatriacontane from leaves (*Deut. Apoth. Ztg.* 1973, *113*, 993; *Chem. Abstr.* 1973, *79*, 123697 w); determination of lauric (26.5), myristic (11.6) and palmitic (47.2%) acids; stearic, arachidic, behenic and lignoceric acids (each 5%) in waxy fraction (*Deut. Apoth. Ztg.* 1973, *113*, 1219; *Chem. Abstr.* 1974, *80*, 45602 r).

Distribution : Bihar to Assam, Orissa, Madhya Pradesh, Nilgiris and Anamalais upto 1000 m.

L. nodiflora Mich.; see *Phyla nodiflora* (L.) Greene

LIQUIDAMBAR (Altingiaceae)

L. styraciflua L.

Eng. - Sweet gum, Red gum; S. - Silhaka; H., B., Mar., Guj. & Kan.- - Silaras; Tel. - Shila rasam; Tam. - Neri-arishippal; Mal. - Rasamalla; Arabic - Silaras; Persian - Meihsila; Trade - Storax, Styrax.

Vitispirane, valeranal and valeranone isolated from leaf oil (*Phytochemistry* 1979, *18*, 876).

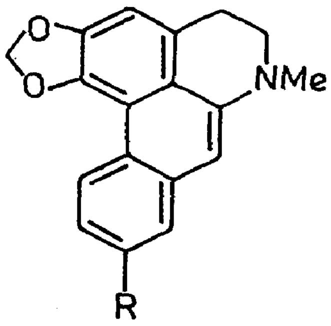
Distribution : Along the Atlantic coast from Connecticut (U.S.A) southwards to Central America. Aromatic balsam known as storax or styrax is imported into India.

LIRIODENDRON (Magnoliaceae)

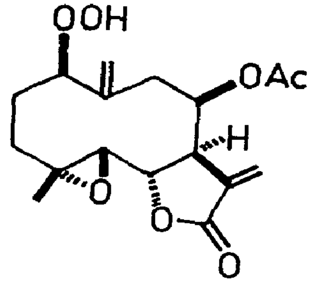
L. tulipifera L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 246).

Two new sesquiterpenes - tulipinolide and epitulipinolide - isolated and their structures established (*J. Org. Chem.* 1970, *35*, 1928; *ibid.* 1972, *37*, 2740); structures assigned to lipiferolide and γ-liriodenolide isolated from leaves and root bark respectively (*Chem. Commun.* 1972, 1137); a new alkaloid - lirinine - isolated from leaves and its structure determined (*Khim. Prir. Soedin.* 1973, *9*, 67; *Chem. Abstr.* 1973, *78*, 159939 v); lirinine methyl ether and lirinine N-oxide isolated from leaves and characterised (*Khim. Prir. Soedin.* 1973,*9*, 505; *Chem. Abstr.* 1974, *80,* 60055 h); in addition to d-caaverine, a new alkaloid - lirinidine - isolated and characterised (*Khim. Prir. Soedin.* 1973, *9*, 760; *Chem. Abstr.* 1974, *81*, 152459 s); a new alkaloid - (+)isolaureline - isolated and its structure established (*Khim. Prir. Soedin.* 1974, *10*, 685; *Chem. Abstr.* 1975, *82*, 86460 c); (+)N-acetylnornantenine and (+)3-methoxy-N-acetylnornantenine isolated from heartwood (*J. Pharm. Sci.* 1974, *63*, 1338); d-isoremerine and d-nornuciferine isolated from leaves (*Khim. Prir. Soedin.* 1974, *10*, 108; *Chem. Abstr.* 1974, *81*, 60821 a); a new alkaloid - liridine, mp. 221° - isolated from wood (*Khim. Prir. Soedin.* 1974, *10*, 112; *Chem. Abstr.* 1974, *81*, 60824 d); structure of liridinine (*Khim. Prir. Soedin.* 1975, *11*, 813; *Chem. Abstr.* 1976, *84*, 150806 r); lipiferolide and epitulipinolide diepoxide isolated from leaves; an elemanolide - epitulipdienolide - and an eudesmanolide - γ-liriodenolide - from root bark (*Phytochemistry* 1975, *14*, 769); peroxyferolide isolated from leaves (*J. Chem. Soc.* 1976, 402); four new N-acetyl noraporphine alkaloids - (-)N-acetylanonaine, (-)N-acetylnornuciferine, (-)N-acetylasimilobine and (-) tuliferoline - isolated from heartwood and characterised (*Phytochemistry* 1976, *15*, 1169); glaucine, dehydroglaucine, asimilobine, N-acetylnornuciferine, norushinsuinine, liriodenine, O-methylantheroline, (+)syringaresinol, its dimethyl ether and syringaldehyde from heartwood (*Phytochemistry* 1976, *15*, 547); (+)syringaresinol, (+)pinoresinol and a new bisepoxylignan - (+)medioresinol - isolated from bark; occurrence of mono and diglucosides of three resinols also shown (*Mokuzal Gakkaishi* 1977, *23*, 405; *Chem. Abstr.* 1977, *87*, 197244 h); dehydroroemerine and dehydroisolaureline isolated and their structures determined (*Khim. Prir. Soedin.* 1977, *13*, 715; *Chem Abstr.* 1978, *88*, 121478 n); a new oxo-aporphine alkaloid - liriodendronine - isolated from sapwood and its structure determined (*Phytochemistry* 1977, *16*, 2015); isolation and characterisation of peroxyferolide (*J. Org. Chem.* 1977, *42*, 3614); a new tetracyclic lignan - lirionol - isolated along with syringic acid methyl ester, (+)pinoresinol, (+)syringaresinol and O-methyl-N-norlirinine from bark and its structure determined (*Phytochemistry* 1978, *17*, 779).

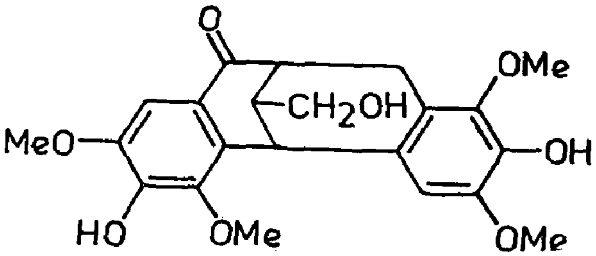
NEW COMPOUNDS



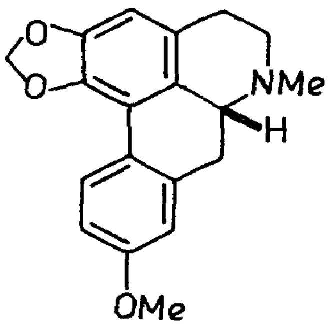
Dehydroroemerine
R = H
Dehydro-isolaureline
R = OMe



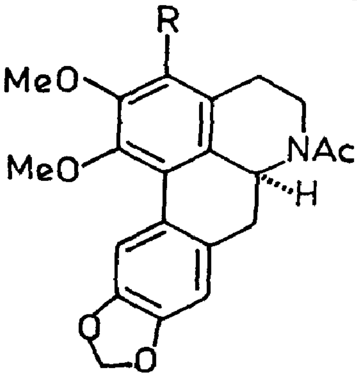
Peroxyferolide



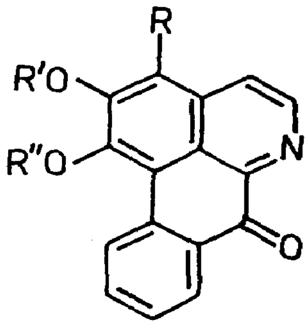
Lirionol



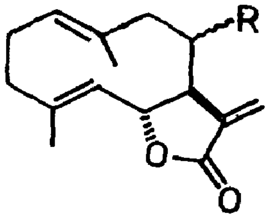
(+)Isolaureline



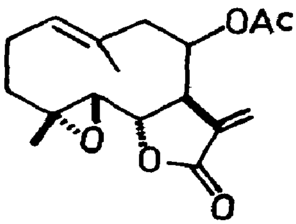
(+)N-Acetylnornantenine
R = H
(+)3-Methoxy-N-acetylnornantenine
R = OMe



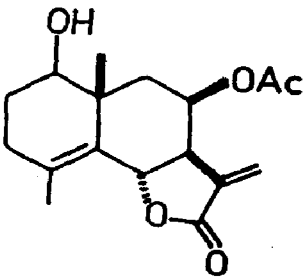
Liridine
R = OMe, R′,R″ = Me
Liriodendronine
R,R′,R″ = H



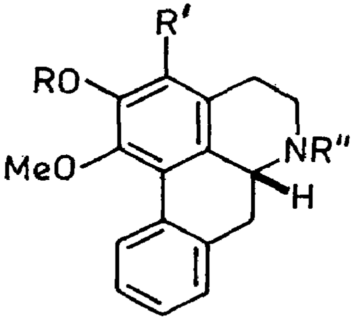
Tulipinolide
R = α-OAc
Epitulipinolide
R = β-OAc



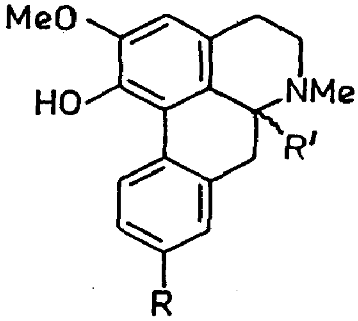
Lipiferolide



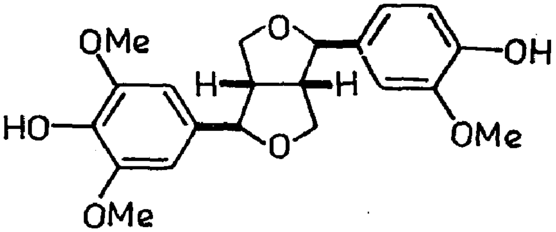
γ-Liriodenolide



N-Acetylasimilobine
R,R' = H, R'' = Ac
Tuliferoline
R = Me, R' = OMe, R'' = Ac
Liridinine
R = H, R' = OMe, R'' = Me



Lirinidine
R = H, R' = α-H
Lirinine
R = OMe, R' = β-H



(+)Medioresinol

BIOLOGICAL ACTIVITY

Lirinine and lirinidine relaxed smooth muscle in isolated rat and rabbit intestine preparations. They also exhibited hypotensive, spasmolytic and cholinolytic activities (*Farmakol. Rastit. Veshchestv* 1976, 111; *Chem. Abstr.* 1978, *89*, 140294 m); lipiferolide and epitulipinolide diepoxide exhibited cytotoxic activity against KB cells (*Phytochemistry* 1975, *14*, 769).

LITCHI (Sapindaceae)

L. chinensis (Gaertn.) Sonner syn. *Nephelium litchi* Camb. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 155).

Friedelin, stigmasterol and stigmasteryl acetate isolated (*J. Indian Chem. Soc.* 1970, *47*, 176).

LITHOCARPUS (Fagaceae)

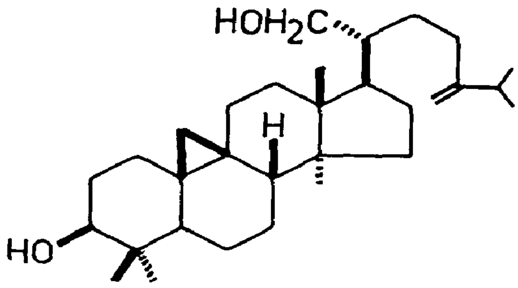
L. polystachya (Wall. ex DC.) Rehd. syn. *Quercus polystachya* Wall. ex DC.

Three new cycloartane derivatives - lithocarpolone (21,24-epoxy-24-hydroxymethylcycloartane-3-one), lithocarpdiol (21,24-epoxy-24-hydroxymethylcycloartane-3βol) and 24-methylenecycloartane- 3β,21-diol (I) - isolated in addition to friedelin, friedelan- 3β-ol, taraxerol, β-amyrin and glutinol (*Phytochemistry* 1974, *13*, 2551); new triterpenes (II,III and

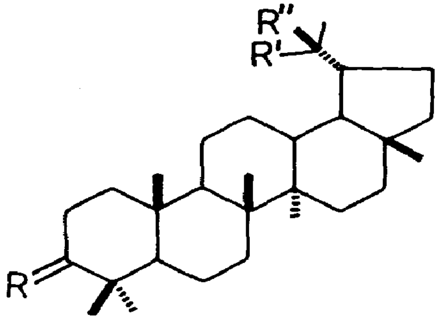
IV) isolated along with friedelan-3β-ol, friedelin, glutinol and betulinic acid from leaves and characterised (*Phytochemistry* 1977, *16*, 112).

Distribution : Manipur.

NEW COMPOUNDS



I



II

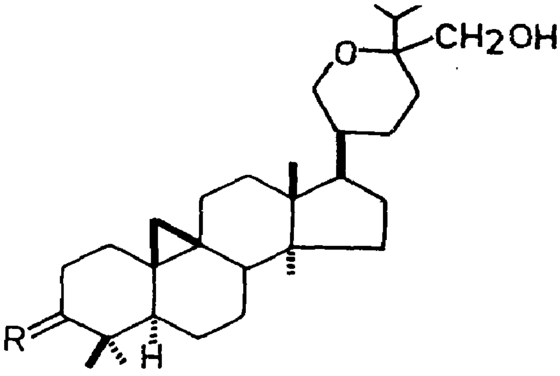
R = O, R′ = OH, R″ = Me

III

R = β-OAc,H, R′ = CHO, R″ = H

IV

R = β-OH,H, R′ = CH_2OH, R″ = H



Lithocarpolone

R = O

Lithocarpdiol

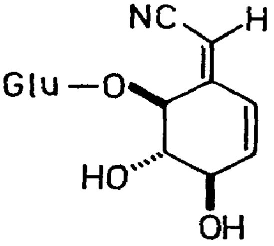
R = H,β-OH

LITHOSPERMUM (Boraginaceae)

L. officinale L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 155).

A new glucoside - lithospermoside - isolated from roots and characterised as 6-O-β-D-glucopyranosyl-1-cyanomethylene-4,5-dihydroxy-2-cyclohexane (*Phytochemistry* 1977, *16*, 707).

NEW COMPOUNDS



Lithospermoside

LITSEA (Lauraceae)

L. chinensis Lam.; see *Neolitsea chinensis* (Lam.) Chun

L. citrata Bl.; see *L. cubeba* (Lour.) Pers.

L. cubeba (Lour.) Pers. syn. *L. citrata* Bl. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 248).

Thirteen components identified in oil from fresh bark; citral (29.5%) was major constituent (*Indian Perfum.* 1976, *20*, 55; *Chem. Abstr.* 1977, *86*, 195056 d).

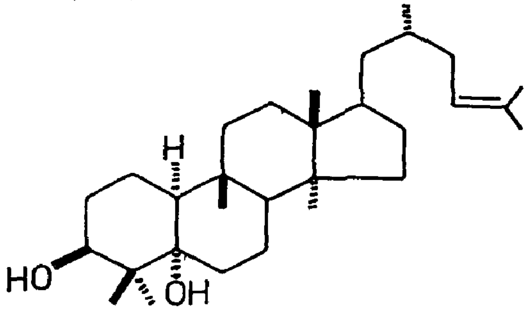
L. deccanensis Gamble syn. *L. tomentosa* Heyne ex Hook.f. (non Blume)

Tam. - Perumbandali; Bo. - Kurak.

A new tetracyclic triterpene - litsomentol - isolated and characterised (*Tetrahedron* 1971, *27*, 4991).

Distribution : Hills of Deccan Peninsula, from Konkan southwards alt. 600-1800 m.

NEW COMPOUNDS



Litsomentol

L. floribunda (Bl.) Gamble syn. *L. wightiana* sensu Hook.f. (non *Cylicodaphene wightiana* Nees).

Boldine and norboldine isolated (*Phytochemistry* 1972, *11*, 3057).

Distribution : Nilgiris, Travancore and Western Ghats, alt. 1500- 2400 m.

L. glutinosa (Lour.) C.B. Robins; see *Neolitsea chinensis* (Lamk.) Chun

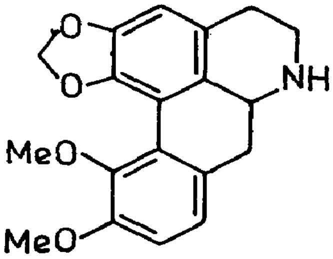
L. nitida Hook.f.

Nep. - Lhopre; Assam - Kathalua, Loban, Supin-um-rong.

A new aporphine alkaloid - litsedine - isolated,besides actinodaphnine and decintrine and its structure determined (*Indian J. Chem.* 1975, *13*, 197).

Distribution : Bihar, Assam, Bhutan and Nepal.

NEW COMPOUNDS



Litsedine

L. sebifera Pers.; see *Neolitsea chinensis* (Lamk.)Chun

L. tomentosa Blume; see *L. deccanensis* Gamble

L. wightiana Hook.f.; see *L. floribunda* (Bl.) Gamble

L. zeylanica C.&T. Nees; see *Neolitsea cassia* (L.) Kostermans

LIVISTONIA (Arecaceae)

L. chinensis R. Br. ex Mart.
Eng. - Chinese fan palm.
(+)Epiafzelechin isolated (*Phytochemistry* 1972, *11*, 2333).
Distribution : Native of China and Japan, grown in gardens in India.

LOBELIA (Lobeliaceae)

L. nicotianaefolia Roth ex Roem. & Schult. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 156).
Lobeline (20%) isolated (*Phytochemistry* 1972, *11*, 2884).

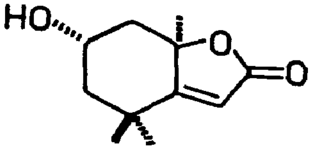
LOCHNERA (Apocynaceae)

L. pusilla (Murr.) K. Schum.; see *Catharanthus pusillus* (Murr.) G.Don

L. rosea (L.) Reichb.; see *Catharanthus roseus* (L.) G.Don

LOLIUM (Poaceae)

L. perenne L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 249).
Absolute configuration of loliolide (*Tetrahedron Lett.* 1972, 2517).
NEW COMPOUNDS



Loliolide

LONICERA (Caprifoliaceae)

L. alpigena L.; see *L. webbiana* Wall. ex DC.

L. japonica Thunb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 249).

Lonicerin (luteolin-7-rhamnoglucoside) isolated (*Yakugaku Zasshi* 1974, *94*, 524; *Chem. Abstr.* 1974, *81*, 13748 x).

L. microphylla Willd. ex Roem. & Schult. (*microphyllus*)

Quercetin, luteolin, its galactoside, 5,7,3,4-tetrahydroxyflavone-7-O-galactofuranoside, p-hydroxybenzoic, protocatechuic, vanillic and p-coumaric acids isolated from leaves (*Khim. Prir. Soedin.* 1978, *14*, 522; *Chem. Abstr.* 1978, *89*, 211934 h).

Distribution : Ladakh and Garhwal Himalayas, alt. 3300-4200 m.

L. quinquelocularis Hardw.

Garhwal - Badkukra.

Sitosterol and l-inositol isolated from aerial parts (*Indian J. Chem.* 1976, *14*B, 475); hexacosanol, octacosanol, n-triacontanol, nonacosane and β-sitosterol isolated (*Indian J. Pharm.* 1977, *39*, 118).

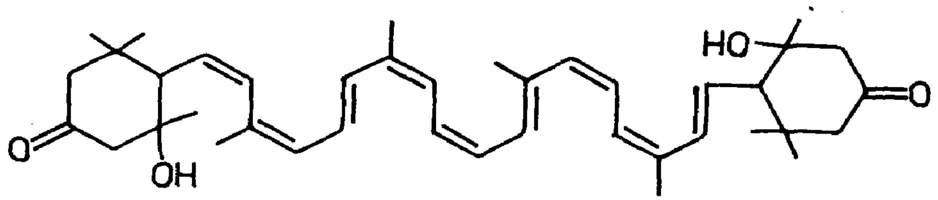
Distribution : Himalayas from Kashmir to Kumaon, alt. 1200-3600 m and Bhutan.

L. webbiana Wall. ex DC. syn. *L. alpigena* auct. (non L.)

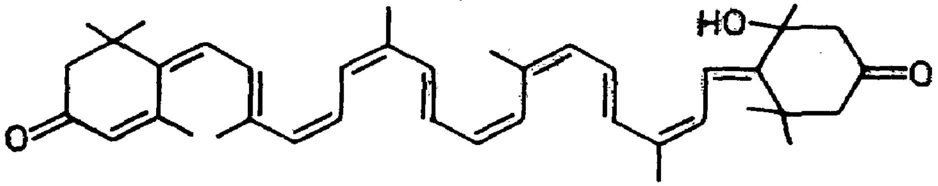
Rhodoxanthin, loniceraxanthin and webbiaxanthin isolated from berries (*Z. Naturforsch.* 1973, *28*C, 434; *Chem. Abstr.* 1974, *80*, 12464 u).

Distribution : Himalayas, Kashmir to Bhutan, alt. 2700-3600 m.

NEW COMPOUNDS



Webbiaxanthin



Loniceraxanthin

LOPHOPETALUM (Celastraceae)

L. fimbriatum Wight; see *L. wightianum* Arn.

L. wightianum Arn. syn. *L. fimbriatum* Wight

Assam - Rumu; Tam. - Venkottei, Vengalkattei; Kan. - Banate, Balpale, Bilihalasu, Sattale, Hottale; Mal. - Venkotta, Venkadavan; Coorg - Palmani; Trade - Banati, Balpale.

Pristimerin and lupeol isolated from bark (*Indian J. Chem.* 1977, *15*B, 291).

Distribution : Lower hill forests of Bengal, Assam and Western Ghats from Konkan southwards upto 900 m.

LORANTHUS (Loranthaceae)

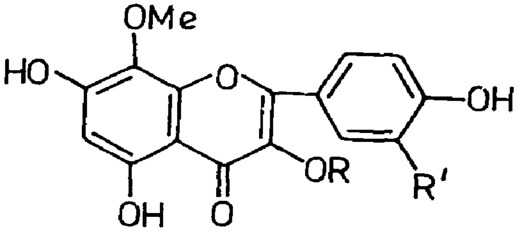
L. longiflorus Desr.; see *Dendropthoe falcata* (L.f.) Etting.

LOTUS (Papilionaceae)

L. corniculatus L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 250).

Isolation and characterisation of corniculatusin as 5,7,3′,4′-tetrahydroxy-8-methoxyflavonol-3-galactoside (*Tetrahedron Lett.* 1970, 803); synthesis of corniculatusin and patuletin (*Acta Chem. Scand.* 1970, *24*, 724); fisetin, geraldol, 3,4′,7-trihydroxyflavone, limocitrin, sexangularetin and gossypetin isolated (*Phytochemistry* 1978, *17*, 827).

NEW COMPOUNDS



Corniculatusin
R = Gal, R′ = OH
Sexangularetin
R,R′ = H

LUFFA (Cucurbitaceae)

L. aegyptiaca Mill. ex Hook.f.; see *L. cylindrica* (L.) M. Roem.

L. cylindrica (L.) M. Roem. syn. *L. aegyptiaca* Mill. ex Hook.f. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 250).

α-Spinasterol, stigmasta-7,22,25-trienol and stigmasta-7,25-dienol isolated from seed oil (*Taehan Hwahak. Hoechi* 1977, *21*, 193; *Chem. Abstr.* 1977, *87*, 130491 t).

L. echinata Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 250).

Alcoholic extract showed definite protection against experimentally-induced liver injury by carbon tetrachloride in rats. Ether extract was found more effective than alcoholic extract (*Indian J. Pharmacol.* 1976, *8*, 129).

L. tuberosa Roxb. syn. *Momordica cymbalaria* Fenzl. ex Naud., *M. tuberosa* Cogn. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 169).

Plant extract was just as effective as chlorpromazine in reversing or quietening septal rage reaction in rats. Moreover rats treated with plant extract did not exhibit catatonia or ataxia (*Arogya* 1976, *2*, 136).

LUPINUS (Papilionaceae)

L. albus L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 251).

Powdered plant showed hypoglycaemic action in rabbits; when the drug was heated to 104° it showed lower activity (*Ars Pharm.* 1978, *19*, 257; *Chem. Abstr.* 1979, *90*, 209997 h).

Crystal structure of angustifoline (*Pol. J. Chem.* 1978, *52*, 665); acacetin, apigenin, luteolin, diosmetin, chrysoeriol, quercetin, isorhamnetin, kaempferol, genistein, orobol, methylenedioxyorobol and 5-methoxygenistein obtained (*Vestsi Akad. Navuk BSSR Ser. Biyal. Navuk* 1978, 99; *Chem. Abstr.* 1978, *88*, 117819 g).

LYCOPERSICON (Solanaceae)

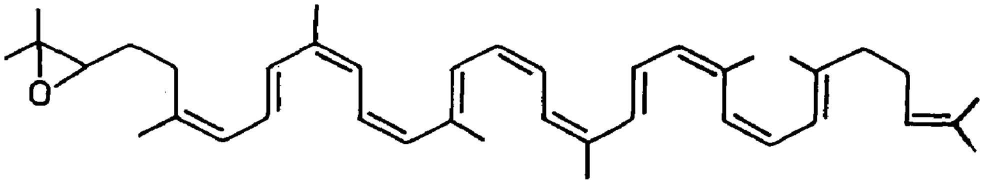
L. esculentum Mill.; see *L. lycopersicum* (L.) Karsten

L. lycopersicum (L.) Karsten syn. *L. esculentum* Mill., *Solanum lycopersicum* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 253).

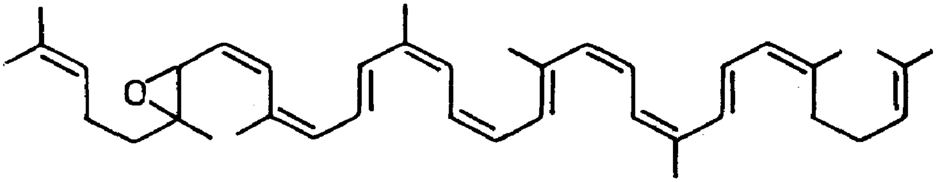
Identification of 5-methylfurfurylketone, furfuryl alcohol, p-anisaldehyde, p-vinylphenol, geraniol and isopropylanisole by GC (*Phytochemistry* 1973, *12*, 2925); lycopene-1,2-epoxide (1,2-epoxy-1,2-dihydro-ψ,ψ-carotene), lycopene-5,6-epoxide (5,6-epoxy-5,6-dihydro-ψ,ψ-carotene), mutatochrome (5,8-epoxy-5,8-dihydro-β,β-carotene), phytoene epoxide (1,2-epoxy-1,2,7,8,11,12,7',8',11',12'-decahydro-ψ,ψ-carotene), phytofluene epoxide (1,2-epoxy-1,2,7,8,11,12,7',8'-octahydro-ψ,ψ-carotene), and 1,2-epoxy-1,2,7,8,7',8',11',12'-octahydro-ψ,γ-carotene (I) isolated (*Phytochemistry* 1973, *12*, 2759); 5α-furostan-3β,22,26-triol-3-[O-β-D-glucopyranosyl-(1→2)-β-D-glucopyranosyl(1→4)-β-D-galactopyranoside]-26-O-β-D-glucopyranoside, mp. 217°, isolated from seeds (*Agric. Biol. Chem.* 1973, *37*, 225; *Chem. Abstr.* 1973, *78*, 156572 j); neotigogenin isolated from seeds (*Org. Khim. Puti Razvit. Khim. Proizvod. Kirg.* 1976, 53; *Chem. Abstr.* 1978, *88*, 141562 p); quercetin and kaempferol from seeds (*J. Indian Chem. Soc.* 1976, *53*, 317); lupeol isolated from seeds (*J. Indian Chem. Soc.* 1977, *54*, 916); lanost-8-en-3β-ol (5.0), lanosterol (tr), 24-methylenelanost-8-en-3β-ol (tr), cycloartanol (55.0), cycloartenol (38.0), 24-methylenecycloartanol (1.0), lupeol (tr), β-amyrin and

daturadiol (1.0%) identified in seeds (*Phytochemistry* 1977, *16*, 1723); 31-norlanost-9(11)enol,24-methyl-31-norlanost-9(11)-enol, 4α,24-dimethylcholesta-7,24-dienol and 4α-methyl-24-ethylcholesta-7,24-dienol (all in tr), 31-norcycloartanol (2.0), 31-norcycloartenol (2.0), cycloeucalenol (2.0), 31-norlanost-8-enol (4.0), 31-norlanosterol (8.0), obtusifoliol (2.0) 4α,14α,24-trimethylcholesta-8,24-dienol (tr), 4α-methylcholest-8-enol (1.0), lophenol (44.0), 24-methyllophenol (tr), 24-ethyllophenol (tr), gramisterol (8.0) and citrostadienol (23.0%) isolated from seed oil (*Phytochemistry* 1978, *17*, 971); leucine, isoleucine, phenylalanine, glutamic acid, tyrosine, valine and γ-aminobutyric acid found in stem (*Biol. Zh. Arm.* 1978, *31*, 648; *Chem. Abstr.* 1979, *90*, 19056 c).

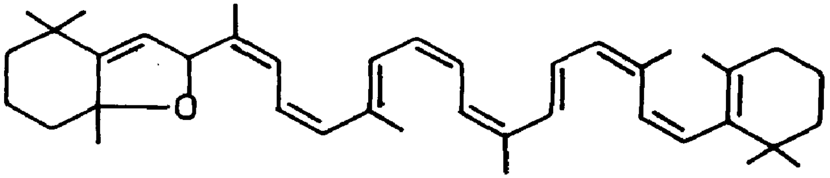
NEW COMPOUNDS



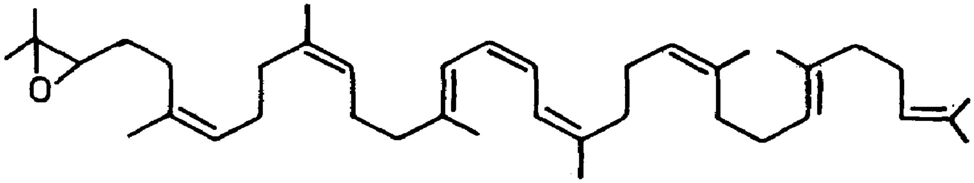
Lycopene-1,2-epoxide



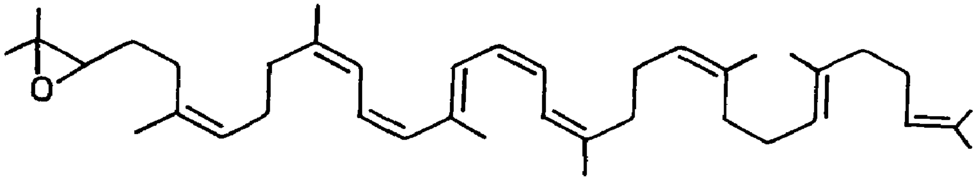
Lycopene-5,6-epoxide



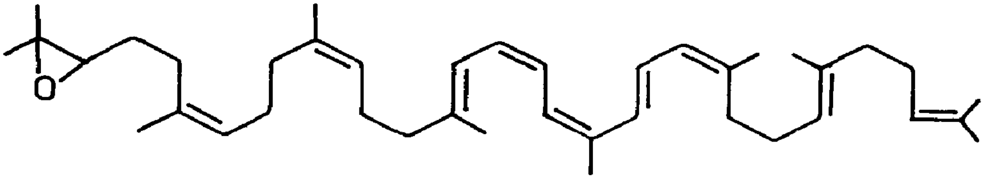
Mutatochrome



Phytoene epoxide



Phytofluene epoxide



I

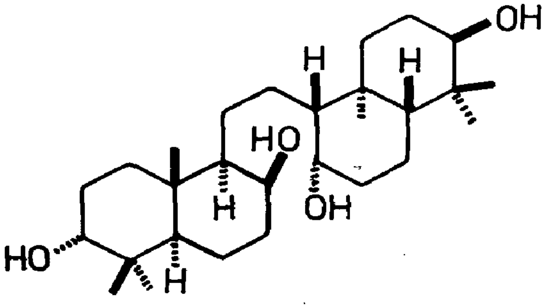
LYCOPODIUM (Lycopodiaceae)

L. cemuum L.; see *Palhinhaea cemua* (L.) Franco & Vasc.

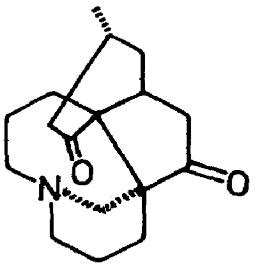
L. clavatum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 254).

A novel triterpene - clavatol (lyclavatol), mp. 277° - isolated and characterised as 3α,8β,14α,21β-tetrahydroxy-26,27-bisnoronocerane (*Chem. Commun.* 1970,1274; *Chem. Pharm. Bull.* 1975, *23*, 1784); a new alkaloid - lycoflexine - isolated and its structure determined (*Tetrahedron Lett.* 1973, 5045); crystal structure of lycopodine (*J. Chem. Soc.* Perkin 2 1975, 93); lycopodine, clavatine, lycodoline, dihydrolycopodine, clavolonine, N-demethyl-α-obscurine and nicotine isolated in addition to two unidentified alkaloids (*Rocz. Chem.* 1977, *51*, 1271; *Chem. Abstr.* 1977, *87*, 180650 q); a new acylated apigenin- 4'-O-β-D-glucoside (I) from leaves (*Planta Med.* 1979, *36*, 196).

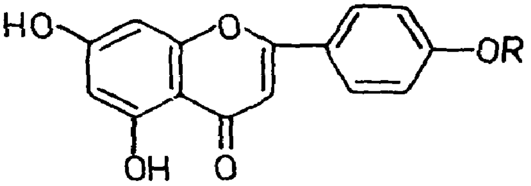
NEW COMPOUNDS



Clavatol



Lycoflexine



I

R = Glu(2′,6′′-p-hydroxycinnamoyl)

L. lucidulum Michx.; see *Huperzia herteriana* (Kumm.) Sen & Sen

L. phlegmarium L. (*phlegmaria*); see *Phlegmariurus phlegmaria* (L.) Sen & Sen

LYCOPUS (Lamiaceae)

L. europaeus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 256).

Lithospermic acid isolated from leaves (*Arzneim. Forsch.* 1970, *20*, 705; *Chem. Abstr.* 1970, 73, 38473 e).

BIOLOGICAL ACTIVITY

Lithospermic acid was biologically inactive but acquired antigonadotropic and glycogen-lowering activities after incubation with a phenol oxidase preparation from leaves (*Arzneim. Forsch.* 1970, *20*, 705; *Chem. Abstr.* 1970, *73*, 38473 e).

LYCORIS (Amaryllidaceae)

L. radiata (L' Herit.) Herbert (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 257).

2(4-Hydroxybenzyl)-malic acid isolated (*Phytochemistry* 1976, *15*, 342); pretazettine isolated from bulbs (*Chem. Pharm. Bull.* 1976, *24*, 1537).

BIOLOGICAL ACTIVITY

2(4-Hydroxybenzyl)-malic acid showed auxin activity (*Phytochemistry* 1976, *15*, 342); lycorine (0.1-0.3 mg/kg) showed little effect on proserine-induced bronchospasms but increased tonus of bronchial musculature in normal cats (*Farmacol. Rastit. Veshchestv* 1976, 71; *Chem. Abstr.* 1978, *89*, 157340 w).

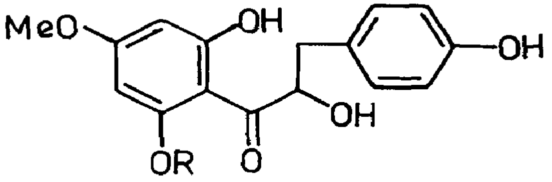
LYONIA (Ericaceae)

L. formosa (Wall.) Hand.-Mazz. syn. *Pieris formosa* D. Don

α-Amyrin, lupeol and β-sitosterol from leaves (*J. Indian Chem. Soc.* 1970, *47*, 97); lyonogenin and its 2′-glucopyranoside (lyonotin) isolated from leaves (*Indian J. Chem.* 1973, *11*, 720).

Distribution : Central and eastern Himalayas, from Nepal to Arunachal Pradesh, alt. 1800-3000 m.

NEW COMPOUNDS



Lyonogenin
R = H
Lyonotin
R = Glu

L. ovalifolia (Wall.) Drude syn. *Pieris ovalifolia* (Wall.) D. Don (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 258).

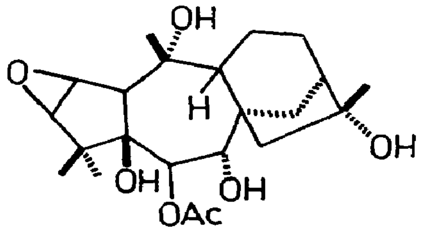
Hexacosane, hexacosanol, β-sitosterol and taraxerol isolated (*Phytochemistry* 1971, *10*, 2247); quercitrin, hyperoside and caffeic acid isolated from leaves (*Indian J. Pharm. Sci.* 1978, *40*, 131).

L. ovalifolia (Wall.) Drude var. *elliptica* (S. & Z.) Hand.-Mazz.

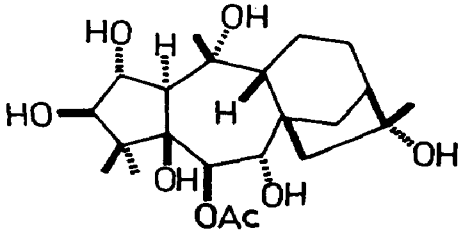
Nonacosane, 2-nonacosanone, 1-tetracosanol, β-sitosterol, taraxerol, betulin-3-acetate and oleanolic acid from shoots (*Yakugaku Zasshi* 1969, *89*, 1736; *Chem. Abstr.* 1970, *72*, 107848 w); structure of lyoniol-A (lyoniatoxin) (*Chem. Pharm. Bull.* 1970, *18*, 852, 854; *Yakugaku Zasshi* 1971, *91*, 1194; *Chem. Abstr.* 1972, *76*, 59786 h); lyoniols A,B and C isolated (*Herba Pol.* 1971, *17*, 92; *Chem. Abstr.* 1971, *75*, 115895 m); characterisation of a new triterpene - 3-O-p-hydroxy-trans-cinnamoylmaslinic acid (I) - from flowers (*Yakugaku Zasshi* 1971, *91*, 1200; *Chem. Abstr.* 1972, *76*, 46336 m); a triterpene glucoside - lyofolic acid - isolated which on hydrolysis yielded a rearranged aglycone, lyofoligenic acid (*Yakugaku Zasshi* 1971, *91*, 1318; *Chem. Abstr.* 1972, *76*, 59959 s); quercetin, its 3-galactoside, luteolin and (-) epicatechin isolated from shoots (*Phytochemistry* 1973, *12*, 2302); a new triterpene arabinoside - ovalifolioside - isolated from leaves and characterised as 1β,23-dihydroxy-3β-L-α-arabinopyranosyloxy-olean-12-ene (*Yakugaku Zasshi* 1974, *94*, 170; *Chem. Abstr.* 1974, *80*, 133754 x); structure elucidation of lyoniol D (*Yakugaku Zasshi* 1974, *94*, 1534; *Chem. Abstr.* 1975, *82*, 135674 m); stereostructure of lyofoligenic acid (*Yakugaku Zasshi* 1975, *95*, 911; *Chem. Abstr.* 1976, *84*, 59775 u).

Distribution : Meghalaya, alt. 1200-1800 m.

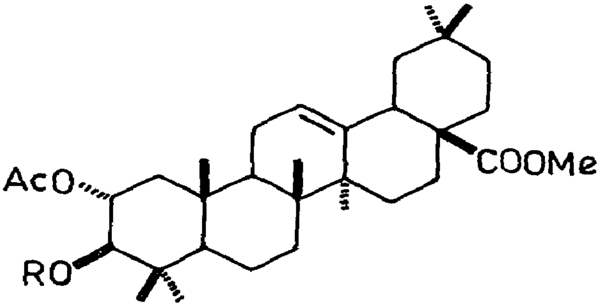
NEW COMPOUNDS



Lyoniol A

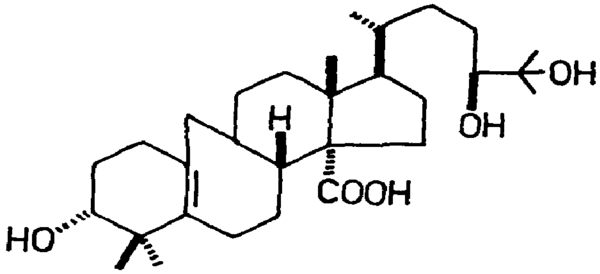


Lyoniol D

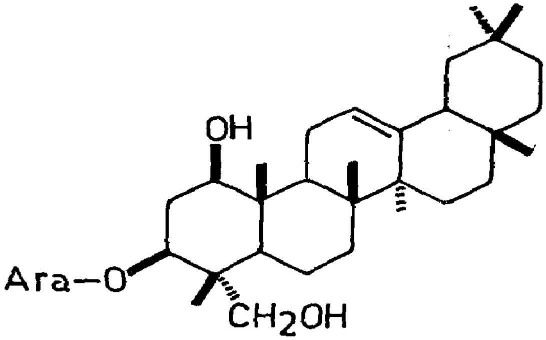


I

R = cinnamoyl(p-OH)



Lyofoligenic acid



Ovalifolioside

MABA (Ebenaceae)

M. buxifolia Pers.; see *Diospyros ferrea* (Willd.) Bakh.

MACARANGA (Euphorbiaceae)

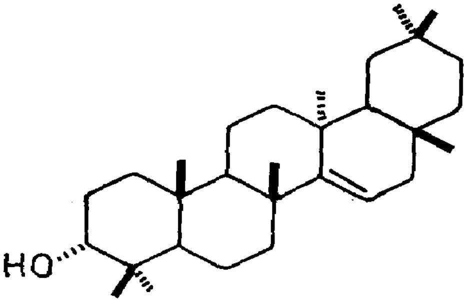
M. denticulata (Bl.) Muell.-Arg.

B.- Jagura; Lepcha - Numrokung; Assam - Jagle, Moralia.

A new triterpene - 3-epitaraxerol - isolated along with taraxerone and β-sitosterol (*Indian J. Chem.* 1973, *11*, 827).

Distribution : Eastern Himalayas, alt. 900-1500 m, Assam, Bengal, Bihar and Orissa upto 1500 m.

NEW COMPOUNDS



3-Epitaraxerol

M. peltata Muell.-Arg. syn. *M. roxburghii* Wight (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 158).

Sitosterol isolated from roots (*Indian J. Chem.* 1977, *15*B, 291).

M. roxburghii Wight; see *M. peltata* Muell.-Arg.

MACHILUS (Lauraceae)

M. edulis King ex Hook.f.

Nep.- Lepche phal, Lapche kawla; Lepcha - Phum-kung.

A trans(2,3)-trans(3,4)-phenyltetralin lignan - (+)guaiacin - isolated from stem bark (*Phytochemistry* 1972, *11*, 811).

Distribution : Eastern Himalayas, alt. 1200-2400 m.

M. glaucescens Wight; see *Persea macrantha* (Nees) Kostermans

M. macrantha Nees; see *Persea macrantha* (Nees) Kostermans

MACLURA (Urticaceae)

M. aurantiaca Nutt.; see *M. pomifera* (Rafin.) C.K. Schm.

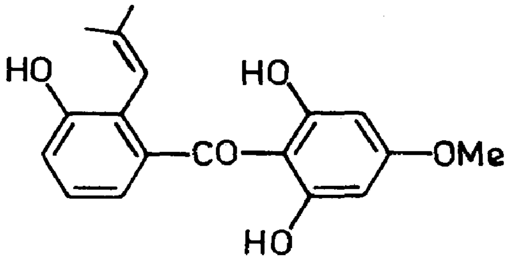
M. cochinchinensis (Lour.) Corner syn. *Cudrania javanensis* sensu Hook.f. p.p., *C. cochinchinensis* (Lour.) Kudo & Masam. ex Sauer.

H. - Manda, Mangei, Kangu.

Osajaxanthone, (-)(S)stachydrine, vanillic and p-hydroxybenzoic acids and methyl fumarate isolated from bark (*J. Pharm. Sci.* 1971, *60*, 1729); butyrospermol and its acetate, sitosterol, kaempferol, aromadendrin, quercetin, taxifolin, populnin and sinensin (aromadendrin-7-O-glucoside) isolated from bark (*Indian J. Chem.* 1975, *13*, 868); crystal structure of cudranone (*Acta Chem. Scand.* 1977, *31*B, 434).

Distribution : Sub-Himalayan tracts from Jammu eastwards to Assam and Meghalaya.

NEW COMPOUNDS



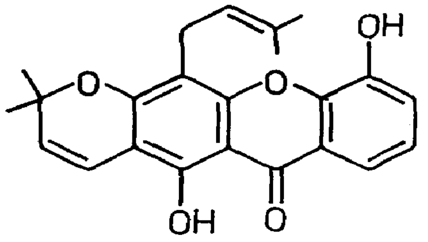
Cudranone

M. pomifera (Rafin.) C.K. Schm. syn. *M. aurantiaca* Nutt. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 258).

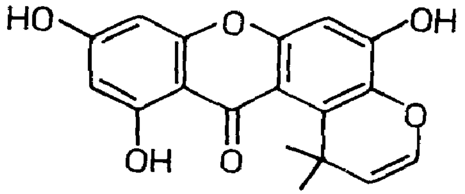
Four new xanthones - toxyloxanthones A,B,C and D - isolated from root bark along with 8-deoxygartanin, 6-deoxyjacareubin and osajaxanthone, resorcinol, kaempferol, quercetin,

morin, dihydromorin, dihydrokaempferol and oxyresveratol isolated from heartwood (*Indian J. Chem.* 1973, *11*, 518); in addition to lupeol, butyrospermol, lupane-3β-20-diol and pigments, osajin and pomiferin, and a new lupeol epimer - 19α-H-lupeol - isolated (*J. Pharm. Sci.* 1975, *65*, 104).

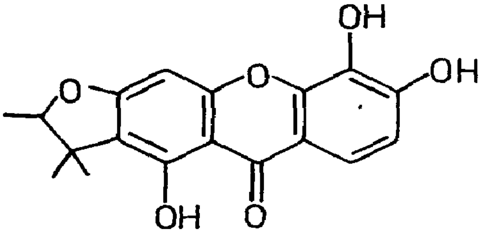
NEW COMPOUNDS



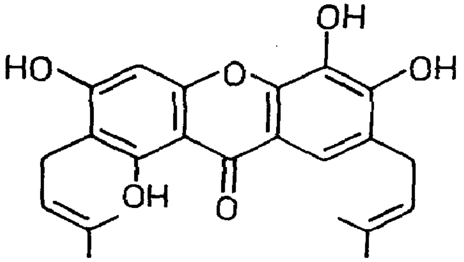
Toxyloxanthone A



Toxyloxanthone B



Toxyloxanthone C



Toxyloxanthone D

MADHUCA (Sapotaceae)

M. butyracea (Roxb.) Macbride syn. *Bassia butyracea* Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 259).

Taxifolin (40 mg/kg, i.p.) showed potent anti-inflammatory activity in exudative and proliferative phases of inflammation in rats. it was one-eighth as active as hydrocortisone in carrageenin-induced oedema. It prevented increase in serum aminotransferase activity during inflammation (*Jap. J. Pharmacol.* 1971, *21*, 377).

M. indica J.F. Gmel.; see *M. longifolia* (Koen.) Macbride

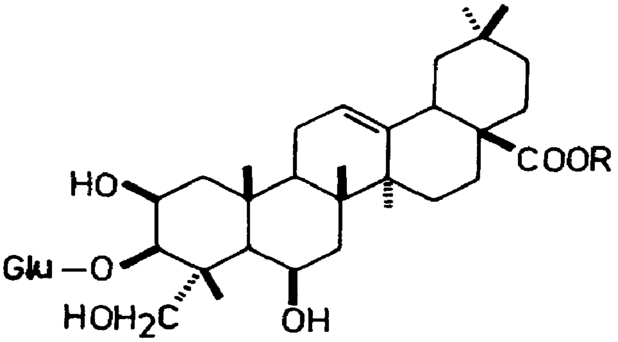
M. latifolia (Roxb.) Macbride; see *M. longifolia* (Koen.) Macbride

M. longifolia (Koen.) Macbride syn. *M. latifolia* (Roxb.) Macbride, *M. indica* J.F. Gmel., *Bassia latifolia* Roxb., *B. longifolia* Koen. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 259).

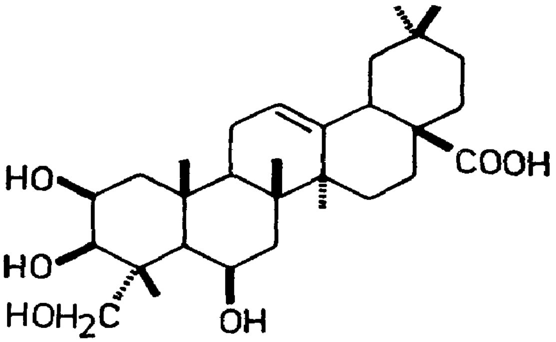
A new saponin - bassianin - isolated which on hydrolysis yielded bassic acid, glucose, arabinose, xylose and rhamnose (*Proc. Nat. Acad. Sci.* India 1971, *41*A, 21; *Chem. Abstr.* 1972, *77*, 123778 g); β-sitosterol-β-D-glucoside, stigmasterol, n-hexacosanol and 3β-caproxyolean-12-en-28-ol isolated from leaves (*Phytochemistry* 1972, *11*, 465); β-carotene, n-octacosanol, sitosterol, its β-D-glucoside, stigmasterol, 3β-palmitoxyolean-12-en-28-ol, oleanolic acid,

quercetin, erythrodiol and palmitic acid isolated from leaves (*Phytochemistry* 1972, *11*, 1533); myricetin and its 3-O-L-rhamnoside isolated from leaves (*Phytochemistry* 1972, *11*, 3090); structure elucidation of saponins A and B isolated from seeds (*Phytochemistry* 1972, *11*, 1791); quercetin, myricetin-3-O-L-rhamnoside and quercitrin isolated (*Curr. Sci.* 1973, *42*, 746); soil bacterial hydrolysis of saponins of seed kernels yielded protobassic acid and prosapogenol (*Tetrahedron* 1974, *30*, 707); Mi-saponin A and Mi-saponin B isolated from seeds and characterised as 3-O-β-D-glucopyranosyl-28-O-[α-L-rhamnopyranosyl-(1→3)-β-D-xylopyranosyl(1→4)-α-L-rhamnopyranosyl(1→2)-α-L-arabinopyranosyl]-protobassic acid and 3-O-β-D-glucopyranosyl-28-O-[3-O-β-D-apio-D-furanosyl-4-O-(α-L-rhamnopyranosyl-(1→3)-β-D-xylopyranosyl)-α-L-rhamnopyranosyl(→2)-α-L-arabinopyranosyl]-protobassic acid respectively (*Chem. Pharm. Bull.* 1975, *23*, 2268); Mi-saponin C isolated from seed kernels, characterised as 3-O-β-D-glucopyranosyl-28-O-[(3-O-α-L-rhamnopyranosyl-4-O-β-D-glucopyranosyl]-β-D-xylopyranosyl(1→4)-α-L-rhamnopyranosyl(1→2)-α-L-arabinopyranosyl)-protobassic acid (*Chem. Pharm. Bull.* 1978, *26*, 1100).

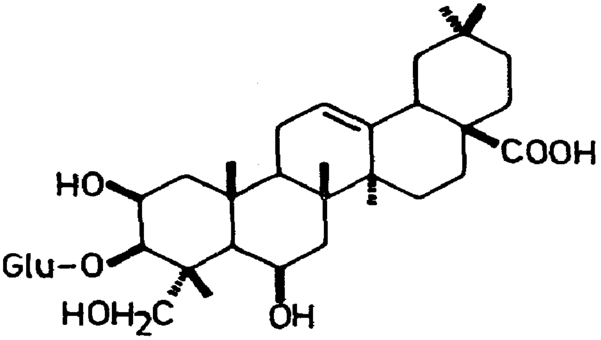
NEW COMPOUNDS



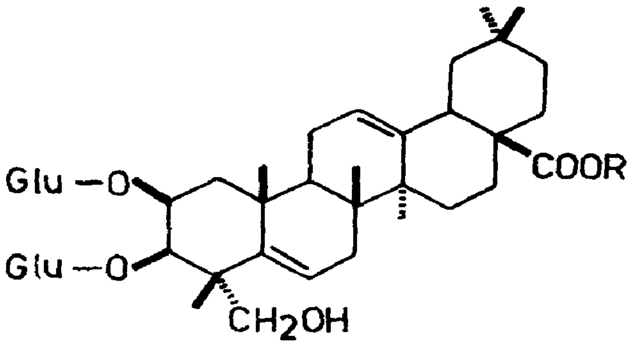
Mi-Saponin A
R = Ara(2→1)Rha(4→1)Xyl(3→1)Rha
Mi-Saponin B
R = Ara(2→1)Rha[(3→1)Apiose](4→1)Xyl(3→1)Rha
Mi-Saponin C
R = Ara(2→1)Rha(4→1)Xyl[(4→1)Glu](3→1)Rha



Protobassic acid



Prosapogenol



Saponin A
R = H
Saponin B
R = Ara(2→1)Xyl(4→1)Rha

M. neriifolia (Moon) H.J. Lam syn. *Bassia neriifolia* Moon

β-Amyrin, its acetate, cinnamate and decanoate, β-amyrenone, betulinic acid, friedelin, hederagenin, isoarborinol, ursolic acid, α-spinasterol and its β-D-glucoside isolated (*Phytochemistry* 1977, *16*, 923).

Distribution : Along banks of streams and rivers in lower Western Ghats.

MAESA (Myrsinaceae)

M. chisia Ham. ex D. Don

Assam - Susi-porma; Khasi - Ja-siet, Diengja-sim; Nep. - Bilouni; Lepcha - Purmo-kung.

α-Spinasterol, its β-D-glucoside, stigmasta-8(14),22-dien-3β-ol and β-amyrin isolated (*Phytochemistry* 1975, *14*, 1133).

Distribution : Nepal eastwards, upto 2100 m.

M. dubia (Wall.) DC.; see *M. indica* (Roxb.) DC.

M. indica (Roxb.) DC. syn. *M. dubia* (Wall.) DC. p.p., *M. indica* (Roxb.) DC. var. *perrottetiana* (DC.) Cl. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 159).

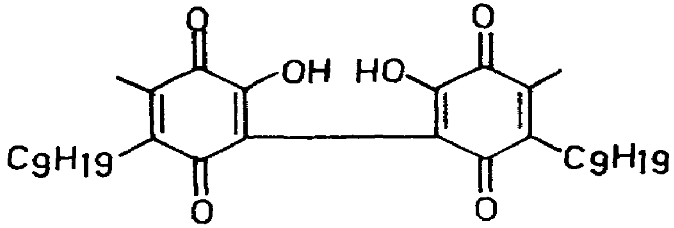
Sitosterol and quercetin-3-rhamnoside isolated from leaves (*Phytochemistry* 1973, *12*, 1826).

M. indica (Roxb.) DC. var. *perrottetiana* (DC.) Cl.; see *M. indica* (Roxb.) DC.

M. macrophylla Wall. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 259).

A quinone - bhogatin - isolated from leaves (*Phytochemistry* 1970, *9*, 415; *Curr. Sci.* 1971, *40*, 320); another quinone - macrophyllin - isolated from leaves (*Curr. Sci.* 1971, *40*, 320).

NEW COMPOUNDS



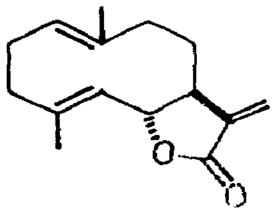
Macrophyllin

MAGNOLIA (Magnoliaceae)

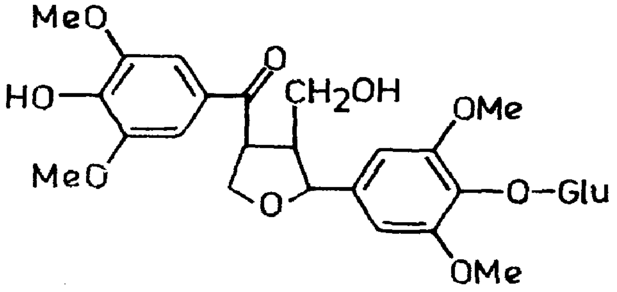
M. grandiflora L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, p. 260).

Isolation and structure determination of magnolidin (*Lloydia* 1975, *38*, 339); C-16 and C-18 fatty acids and β-sitosterol isolated from seed oil (*Tokyo Gakugei Daigaku Kiyo, Dai-4-Bu* 1977, *29*, 116; *Chem. Abstr.* 1978, *89*, 20312 u); peroxycostunolide (verlotorin) and peroxyparthenolide isolated from leaves; their structures and stereochemistry determined (*Tetrahedron Lett.* 1977, 1973; *J. Org. Chem.* 1979, *44*, 3952); a new phenolic compound-2′,3,5′-diallyl-2′-hydroxy-4-methoxybiphenyl (I) - isolated from seeds along with magnolol and honokiol and characterised (*Lloydia* 1978, *41*, 442); structure elucidation of magnolenin C isolated from bark along with syringin and acanthoside B (*Lloydia* 1978, *41*, 56); structure of costunolide isolated along with santamarine and reynosin (*J. Pharm. Sci.* 1978, *67*, 347).

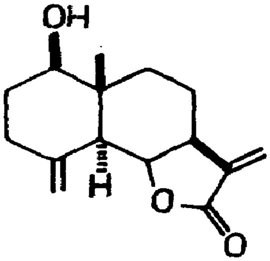
NEW COMPOUNDS



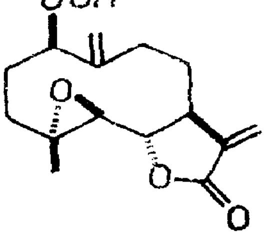
Costunolide



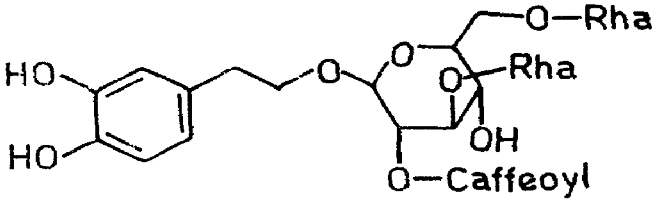
Magnolenin C



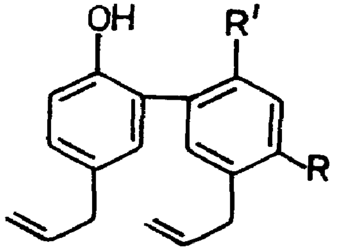
Reynosin



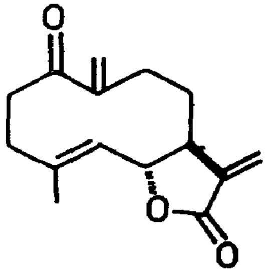
Peroxyparthenolide



Magnolidin



Honokiol
R = H, R' = OH
Magnolol
R = OH, R' = H
I
R = OMe, R' = H



Peroxycostunolide

BIOLOGICAL ACTIVITY

Liriodenine at 0.25-3.0 mg/kg dose stimulated respiration and showed short-lasting hypotensive effect in dogs (*Farmakol. Alkaloidov Ikh Proizvod.* 1972, 118; *Chem. Abstr.* 1974, *80*, 91212 m); ED50 of peroxycost unolide and peroxyparthenolide against Eagle's KB cells were 2.7 and 2.8 μg/ml respectively (*Tetrahedron Lett.* 1977, 1973).

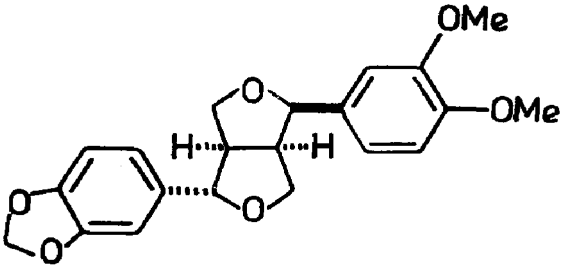
M. hodgsonii (Hook.f. & Thoms.) Keng syn. *Talauma hodgsonii* Hook.f. & Thoms.

Assam - Boramthuri, Datbhola; Khasi - Dieng-sohpydem; Garo - Pankakro; Mikir - Boron-thari-arong; Manipur - Uthum; Lepcha–Siffoo, Safan; Nep. - Patpatta, Haree; Lushai - Thingtumbu.

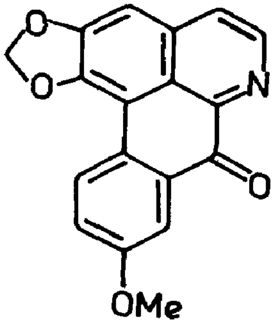
Tetrahydrofurofuranoid lignans - sesamin, (+)fargesin and (+)pinoresinol dimethyl ether along with an oxoaporphine alkaloid - lanuginosine - and β-sitosterol isolated from leaves; lanuginosine and β-sitosterol isolated from root bark and trunk; liriodenine also obtained from root bark (*J. Indian Chem. Soc.* 1977, *54*, 790).

Distribution : Hills of North Bengal, Sikkim, Bhutan and north- eastern India, ascending to about 1800 m.

NEW COMPOUNDS



Fargesin



Lanuginosine

MAHONIA (Berberidaceae)

M. acanthifolia G. Don syn. *Berberis acanthifolia* Wall.

Berberine and palmatine isolated as tetrahydro derivatives from stem bark (*Proc. Nat. Acad. Sci.* India 1977, *47*A, 93; *Chem. Abstr.* 1978, *89*, 176334 p); methyl 19-ketodocosanoate isolated from stem bark (*Proc. Nat. Acad. Sci.* India 1977, *47*A, 82; *Chem. Abstr.* 1978, *89*, 211923 d).

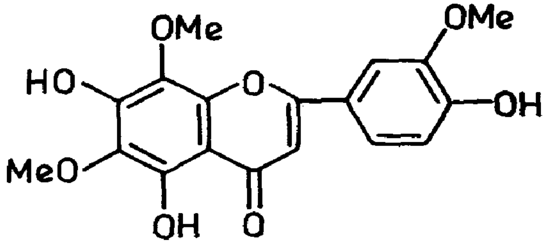
Distribution : Himalayas, Kumaon to Bhutan and Arunachal Pradesh, alt. 2400-2900 m.

MAJORANA (Lamiaceae)

M. hortensis Moench syn. *Origanum majorana* L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 160).

Majoranin from leaves identified as 4',5,7-trihydroxy-3',6,8-trimethoxyflavone (*Curr. Sci.* 1972, *41*, 202); luteolin-7-β-D-diglucoside, apigenin-7-β-D-glucoside and diosmetin-7-β-D-glucuronide isolated (*Herba Pol.* 1975, *21*, 347; *Chem. Abstr.* 1976, *85*, 74939 q).

NEW COMPOUNDS



Majoranin

MALAXIX (Orchidaceae)

M. acuminata D. Don forma *acuminata* syn. *Microstylis wallichii* Lindl.

β-Sitosterol, ceryl alcohol, glucose, rhamnose and choline isolated from pseudo bulbs (*Planta Med.* 1971, *20*, 156).

Distribution : Himalayas, Himachal Pradesh to Sikkim alt. 1500- 2000 m.

MALLOTUS (Euphorbiaceae)

M. philippinensis (Lam.) Muell.-Arg. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 260).

Betulin-3-acetate, lupeol, lupeol acetate, sitosterol and bergenin isolated from heartwood; acetylaleuritolic acid, α-amyrin, sitosterol and bergenin isolated from bark (*Phytochemistry* 1972, *11*, 1511).

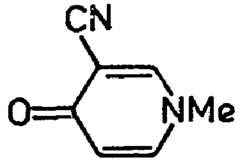
M. repandus (Willd.) Muell.- Arg.

Bergenin isolated from stem (*Phytochemistry* 1976, *15*, 328); isolation and crystal structures of mallotucins A and B (*Heterocycles* 1976, *5*, 227); new triterpens - 3β-hydroxy-13α-ursan-

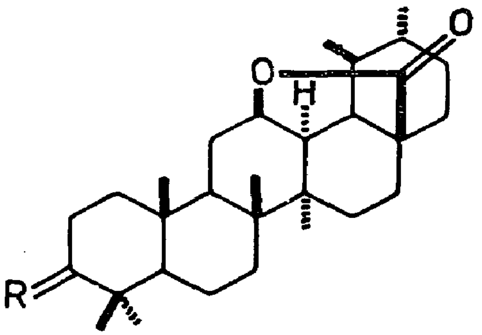
28,12β-olide (I), its benzoate (II) and 3α-hydroxy-13α-ursan-28,12β-olide (III) - isolated along with ursolic acid, α-amyrin, friedelin and lupeol (*Phytochemistry* 1977, *16*, 113); mallorepine isolated from aerial parts (*Planta Med.* 1978, *33*, 385).

Distribution : Throughout India, from tropical Himalayas in Bhutan to Assam and southwards to Travancore.

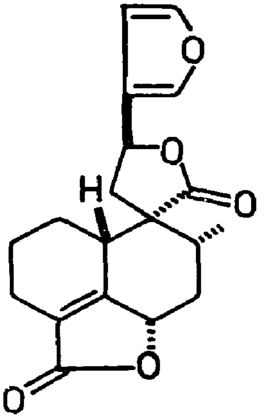
NEW COMPOUNDS



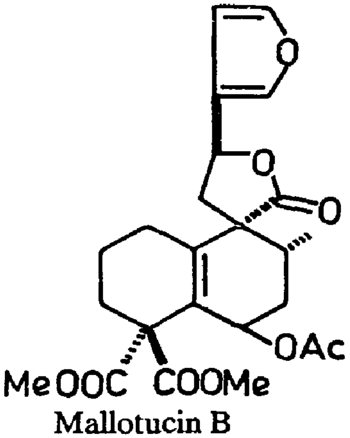
Malloreprine



I
R = α-H, β-OH
II
R = α-H, β-OBz
III
R = α-OH, β-H



Mallotucin A



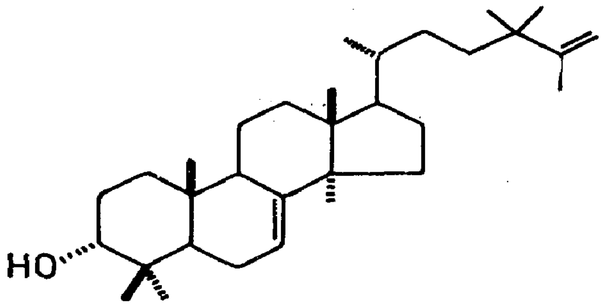
Mallotucin B

M. stenanthus Muell.-Arg.

A new triterpenoid - mallotin - isolated and characterised as 24,24-dimethylanosta-7,25-dien-3α-ol (*Phytochemistry* 1975, *14*, 2253).

Distribution : Western Ghats.

NEW COMPOUNDS



Mallotin

MALUS (Rosaceae)

M. communis DC.; see *M. pumila* Mill.

M. pumila Mill. syn. *M. sylvestris* Hort. (non Mill.), *M. communis* DC., *Pyrus malus* L. p.p. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 261).

Crystal structure of epifriedelinol (*Tetrahedron Lett.* 1977, 3839); quercetin-3-O-α-D-galactoside, 3-O-xyloside, 3-O-α-L-arbinofuranoside,3-O-rhamnoside and 3-O-β-D-glucoside along with rutin isolated from fruits (*Z. Lebensm.-Unters. Forsch.* 1978, *166*, 80; *Chem. Abstr.* 1978, *88*, 148955 c).

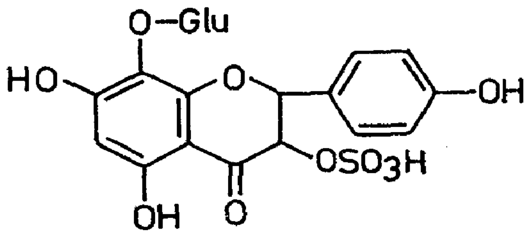
M. sylvestris Hort.; see *M. pumila* Mill.

MALVA (Malvaceae)

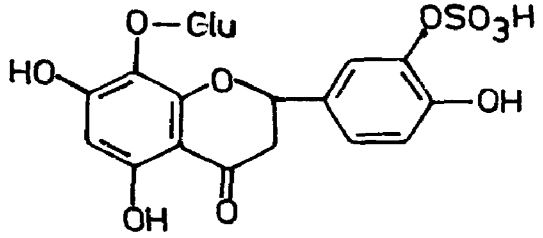
M. sylvestris L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 262).

Malvidin-3-β-D-glucopyranoside, delphinidin-3-β-D-glucopyranoside (mirtillin) and delphinidin-3,5-β-D-diglucopyranoside (malvin) isolated from flowers (*Khim. Prir. Soedin.* 1975, *11*, 255; *Chem. Abstr.* 1975, *83*, 111117 b); two new flavonol glycosides - gossypin-3-sulphate and hypoletin-8-O-β-D-glucosido-3'-sulphate - isolated from leaves (*Phytochemistry* 1977, *16*, 145).

NEW COMPOUNDS



Gossypin-3-sulphate



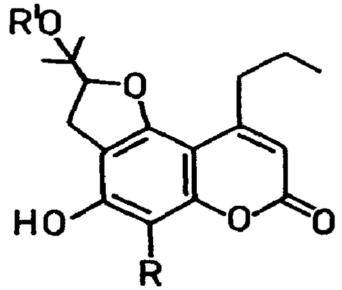
Hypoletin-8-O-β-D-glucoside 3'-sulphate

MAMMEA (Clusiaceae)

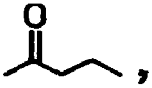
M. americana L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 262).

A crystalline mixture of two isomeric coumarins - acetoxymammea B/BA and acetoxymammea B/BB - isolated and characterised (*Tetrahedron Lett.* 1970, 251; *J. Chem. Soc.* Perkin 1 1972, 2255); six 4-propylcoumarins - furomammea A,B,C,D,E and F - identified from seeds (*Tetrahedron Lett.* 1970, 3975; *J. Chem. Soc.* Perkin 1 1972, 2241); three 4-propyldihydroxanthyletin type coumarins - pyranomammea A,B and C - isolated from seeds and identified (*Tetrahedron Lett.* 1970, 3975); mammea B/AA, B/AB and B/AC and three other 4-propyl compounds - furomammea G, MAB 4 and (I) - and two 4-phenyl compounds - phenylmammea A and B - isolated (*Tetrahedron Lett.* 1970, 3979, 3983; *J. Chem. Soc.* Perkin 1 1972, 2248); normammein, neomammein, mammein and their respective cyclocoumarins (furomammea A,B and C) arising from oxidative cyclisation of isopentenyl group with 5-OH, isolated and characterised (*J. Pharm. Sci.* 1972, *61*, 1599); five new 4-alkyl coumarins (II-VI) isolated and characterised (*Tetrahedron Lett.* 1972, 3187); 2- and 4-hydroxyxanthones together with 1,5- and 1,7-dihydroxyxanthones isolated from seeds (*J. Chem. Soc.* Perkin 1 1972, 1896).

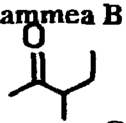
NEW COMPOUNDS



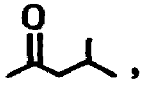
Furomammea A

R = , R' = H

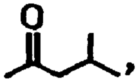
Furomammea B

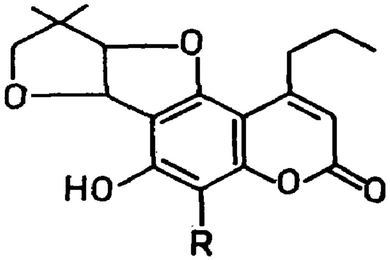
R = , R' = H

Furomammea C

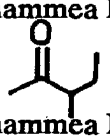
R = , R' = H

Furomammea D

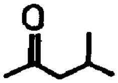
R = , R' = OH

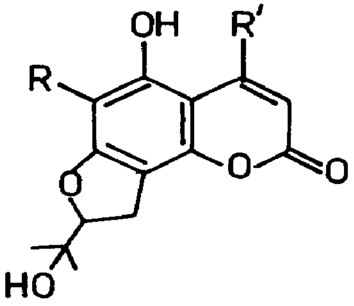


Furomammea E

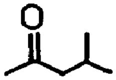
R = 

Furomammea F

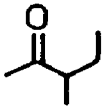
R = 



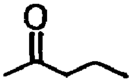
Furomammea G

R =  , R′ =

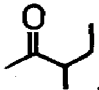
MAB 4

R =  , R′ =

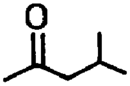
I

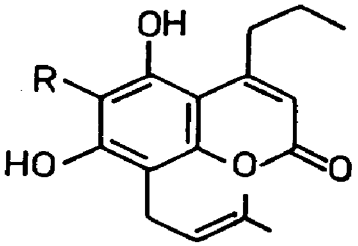
R =  , R′ =

Phenylamammea A

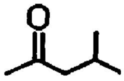
R =  , R′ =

Phenylammea B

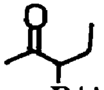
R =  , R′ =



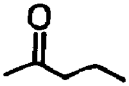
Mammea B/AA

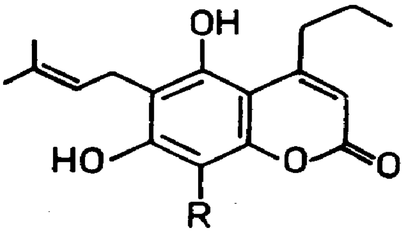
R = 

Mammea B/AB

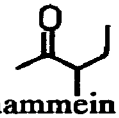
R = 

Mammea B/AC

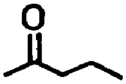
R = 

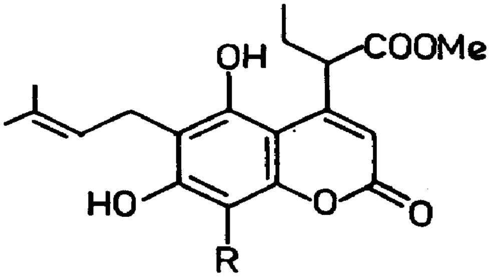


Neomammein

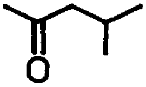
R = 

Normammein

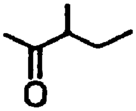
R = 

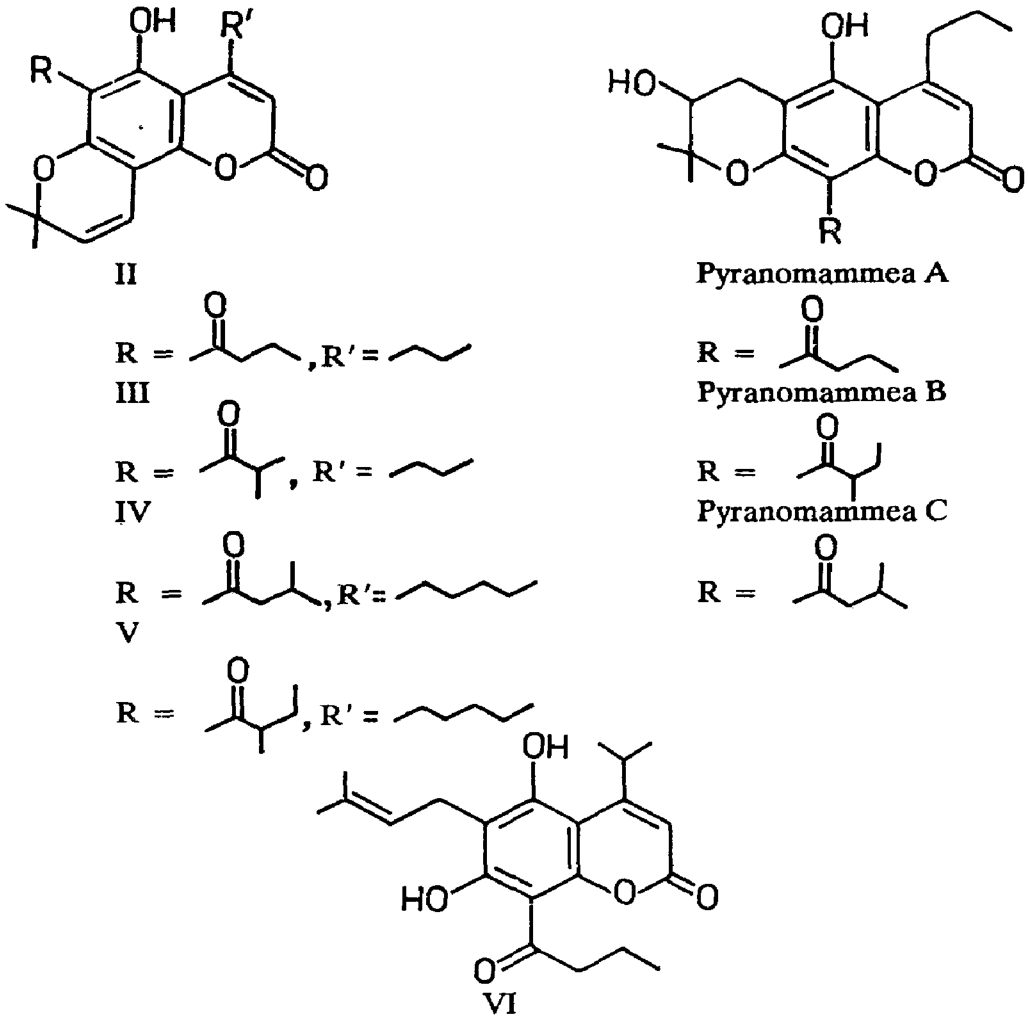


Acetoxymammea B/BA

R = 

Acetoxymammea B/BB

R = 



BIOLOGICAL ACTIVITY

Isomeric coumarins, acetoxymammea B/BA and acetoxymammea B/BB, showed insecticidal activity against mustard beetle and housefly (*Tetrahedron Lett.* 1970, 251); mammein and certain allied coumarins exhibited significant antitumour activity against sarcoma 180 grown in stationary cell culture (*J. Pharm. Sci.* 1972, *61*, 1599).

M. longifolia Planch. ex Triana; see *M. suriga* (Ham. ex Roxb.) Kosterm.

M. suriga (Ham. ex Roxb.) Kosterm. syn. *M. longifolia* Planch. ex Triana, *Ochrocarpus longifolius* Benth. & Hook.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 264).

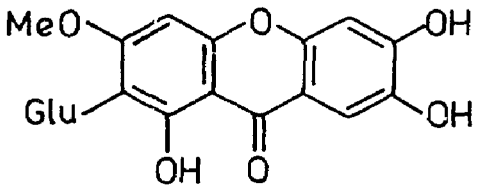
Squalene, cycloartenol, campesterol, stigmasterol and β-sitosterol isolated (*Indian J. Chem.* 1974, *12*, 226); flowers contained vitexin and mesoinositol (*Curr. Sci.* 1978, *47*, 414).

MANGIFERA (Anacardiaceae)

M. indica L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 265).

A new xanthone C-glycoside - homomangiferin - isolated and characterised as 2C-β-D-glucopyranosyl-3-methoxy-1,6,7-trihydroxyxanthone (*Chem. Pharm. Bull.* 1970, *18*, 2224); leucine, tyrosine and valine present in leaves; protocatechuic acid, catechin and mangiferin in bark while alanine, glycine, γ-aminobutyric acid, kinic and shikimic acids found both in leaves and bark (*Planta Med.* 1970, *18*, 185); β-sitosterol, (+)catechin, ($\pm$)catechin, (-)epicatechin and leucocyanidin found in seed coat (*Curr. Sci.* 1971, *40*, 157); stearic acid isolated from seeds (*UAR J. Chem.* 1971, *14*, 653; *Chem. Abstr.* 1973, *79*, 123641 y); exudate from stems contained gum (16.0) and resin (81.0%) (*Sci. Cult.* 1972, *38*, 38); detection of methyl, ethyl, propyl, butyl, amyl and iso-butyl alcohols in leaf oil; isomyl alcohol, α-pinene, β-pinene, myrcene, limonene and fenchone in pericarp oil and methyl, propyl, isopropyl, butyl and isoamyl alcohols in seed oil by GLC (*Egypt. J. Chem.* 1972, *15*, 247; *Chem. Abstr.* 1973, *79*, 123696 v); a new triterpene - indicenol, mp. 185^{o} - from Egyptian plant (*Indian J. Chem.* 1973, *11*, 405).

NEW COMPOUNDS



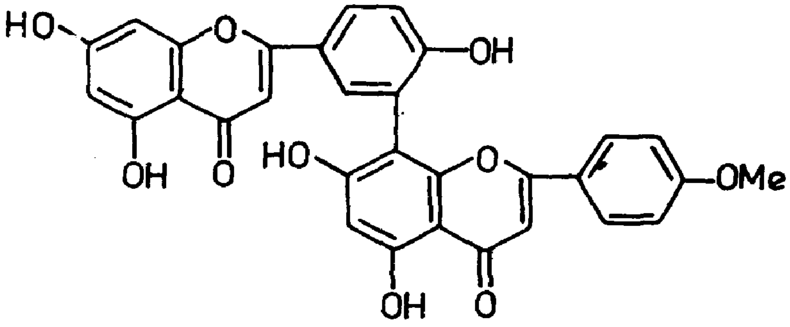
Homomangiferin

MANIHOT (Euphorbiaceae)

M. esculenta Crantz syn. *M. utilissima* Pohl. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 266).

Significant amount of rutin present in leaves (*Phytochemistry* 1971, *10*, 2548); Fe,Cu,Zn and Mn content in roots higher than in leaves; protein level in roots one-eighth that in leaves (*Bol. Tec. Cent. Technol. Agric. Aliment. Rio de Janeiro* 1973, 23; *Chem. Abstr.* 1973, *79*, 113213 w); quercetin, chlorogenic acid, esters of p-coumaric, caffeic, ferulic and sinapic acids, glycosides of caffeic and ferulic acids and luteolin glycosides detected in leaves (*Can. J. Bot.* 1974, *52*, 2381; *Chem. Abstr.* 1975, *82*, 83045 k); amentoflavone and podocarpusflavone A isolated from leaves (*Phytochemistry* 1974, *13*, 2619).

NEW COMPOUNDS



Podocarpusflavone A

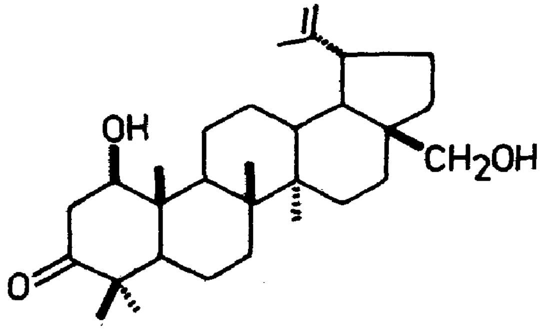
M. utilissima Pohl.; see *M. esculenta* Crantz

MANILKARA (Sapotaceae)

M. hexandra (Roxb.) Dubard syn. *Mimusops hexandra* Roxb. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 267).

A new triterpene ketone - hexandrone - isolated along with taraxerol and β-sitosterol (*Curr. Sci.* 1971, *40*, 657); quercetin and quercitrin isolated (*Curr. Sci.* 1973, *42*, 746); a new triterpene - hexandrin - isolated and characterised along with α-amyrin cinnamate, α-amyrin acetate, lupeol acetate, epifriedelinol, taraxerol, ursolic acid and a mixture of β-sitosterol and stigmasterol (*Indian J. Chem*. 1977, *15*B, 911).

NEW COMPOUNDS



Hexandrin

M. littoralis (Kurz) Dubard syn. *Mimusops littoralis* Kurz

Eng.- Andaman bulletwood; Andaman - Pinle-mohwa, Dogola.

Bassic acid, β-amyrin, quercitol and quercetin isolated from bark (*Indian J. Pharm.* 1977, *39*, 85); β-amyrin caproate and taraxerol lignocerate isolated from bark along with taraxerone, taraxerol methyl ether, lupeol acetate, β-amyrin and β-sitosterol-β-D-glucoside (*Fitoterapia* 1977, *48*, 68); protobassic acid isolated from bark (*Fitoterapia* 1978, *49*, 104).

Distribution : Andaman and Nicobar Islands.

M. zapota (L.) P.van Royen syn. *Achras sapota* L., *A. zapota* L., *Mimusops manilkara* G. Don (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 4).

α- And β-amyrin acetates, taraxerol, taraxeryl acetate, ursolic acid, β-sitosterol-β-D-glucoside, glucose and quercitol isolated from leaves; seeds contained oleanolic acid, hederagenin and bassic acid (*Phytochemistry* 1969, *8*, 2255); myricetin and its 3-O-L-rhamnoside isolated from leaves (*Phytochemistry* 1972, *11*, 3090); hederagenin, bayogenin, polygalacic acid and protobassic acid isolated from wood; former two also obtained by hydrolysis of saponins (*Aust. J. Chem*. 1978, *26*, 1827).

MAPPIA (Icacinaceae)

M. foetida (Wt.) Miers; see *Nothapodytes nimmoniana* (Graham) Mabberley

M. oblonga Miers; see *Nothapodytes nimmoniana* (Graham) Mabberley

M. oblonga Miers var. *elliptica* Miers; see *Nothapodytes nimmoniana* (Graham) Mabberley

M. ovata Miers; see *Nothapodytes nimmoniana* (Graham) Mabberley

M. tomentosa Miers; see *Nothapodytes nimmoniana* (Graham) Mabberley

MARKHAMIA (Bignoniaceae)

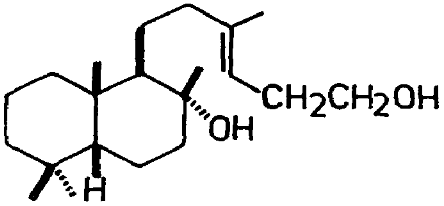
M. stipulata (Wall.) Seem.; see *Dolichandrone stipulata* Benth.

MARRUBIUM (Lamiaceae)

M. vulgare L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 267).

Stereostructure of marrubiin (*Tetrahedron* 1970, *26*, 1561); synthesis of marrubiin (*Tetrahedron*, 1972, *28*, 611); isolation of a new diterpenoid - vulgarol - and its structure elucidation (*Khim. Prir. Soedin*. 1975, *11*, 722; *Chem. Abstr.* 1976, *84*, 150776 f); apigenin, its 7-glucoside, luteolin, its 7-glucoside, quercetin-3-glucoside and quercetin-3-rhamnoglucoside isolated from herb (*Herba Pol.* 1978, *24*, 183; *Chem. Abstr.* 1979, *91*, 52763 z); C-13 epimeric premarrubiins I and II isolated (*Gazz. Chim. Ital.* 1979, *109*, 145; *Chem. Abstr.* 1979, *91*, 211615 w).

NEW COMPOUNDS



Vulgarol

12 FEB 1996

MARSDENIA (Asclepiadaceae)

M. tenacissima (Roxb.) Moon

H.- Jiti, Chiti, Tongus, Marua-bel, Babal jak; B.- Juti, Chiti; Oriya - Gha; Nep.- Bahuni lahara, Sunamarai; Lepcha- Kamtiongrik; Tel.- Karudushtupatige.

Alcoholic extract of root abolished contractions induced by histamine and acetylcholine in guinea pig ileum. It also induced mild CNS depression (*Indian J. Pharm.* 1976, *38*, 54).

17β-Marsdenin, 17α-marsdenin, D-cymarose, β-D-glucosyl-L-thevetose, cinnamic acid and acetic acid obtained by acid hydrolysis of glycoside mixture from roots (*Indian J. Pharm.* 1976, *38*, 54).

Distribution : Sub-Himalayan tracts from Kumaon eastwards escending upto 1500 m and extending southwards to Deccan Peninsula.

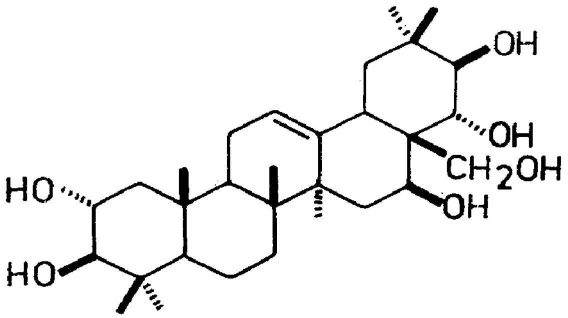
MARSILEA (Marsiliaceae)

M. minuta L.

A new triterpene - marsileagenin A - isolated by acid hydrolysis of crude saponin and characterised as olean-12-en- 2α,3β,16β,21β,22α,28-hexol (*Tetrahedron* 1975, *31*, 1781).

Distribution : Throughout plains of India.

NEW COMPOUNDS



Marsileagenin A

MARTYNIA (Martyniaceae)

M. annua L. syn. *M. diandra* Glox. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 162).

Pelargonidin-3,5-diglucoside and cyanidin-3-galactoside isolated from flowers (*Vijnana Parishad Anusandhan Patrika* 1978, *21*, 177; *Chem. Abstr.* 1979, *90*, 183171 g).

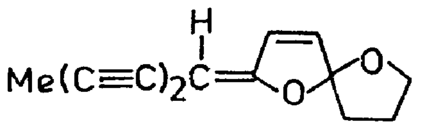
M. diandra Glox.; see *M. annua* L.

MATRICARIA (Asteraceae)

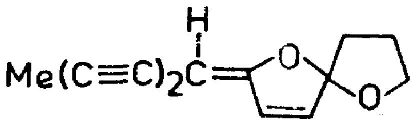
M. chamomilla L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 268).

Isolation of l-α-bisabolol oxide B (*Indian J. Chem.* 1969, *7*, 1060); bisabolol oxide A, bisabolol oxide B and compounds I and II isolated from flower essential oil (*Deut. Apoth. Ztg.* 1975, *117*, 275; *Chem. Abstr.* 1977, *86*, 161109 h; *Naturforsch.* 1978, *33C*, 589; *Chem. Abstr.* 1978, *89*, 152568 s); studies on structure of pectic acid (*Khim. Prir. Soedin.* 1977, *13*, 186; *Chem. Abstr.* 1977, *87*, 98858 e); α-farnesene and β-farnesene isolated from root essential oil (*Naturforsch.* 1978, *33C*, 589; *Chem. Abstr.* 1978, *89*, 152568 s); detection of bisabolol, compound II (2-(2,4-hexadiynylidene)-1,6-dioxaspiro-4,4-non-3-ene) and chamazulene in essential oil by GLC (*Acta Pol. Pharm.* 1978, *35*, 699; *Chem. Abstr.* 1979, *91*, 87300 y; *Herba Pol.* 1978, *24*, 215; *Chem. Abstr.* 1979, *91*, 128889 t); polysaccharide from flowers shown to be composed of glucose, fructose, arabinose, xylose, rhamnose and galacturonic acid (*Farm. Obz.* 1979, *48*, 111; *Chem. Abstr.* 1979, *91*, 35698 q); herniarin, umbelliferone and apigenin found in flowers and foliage; α-farnesene also obtained from stem, roots and foliage (*Planta Med.* 1979, *36*, 322).

NEW COMPOUNDS



Compound I



Compound II

BIOLOGICAL ACTIVITY

(-)α-Bisabolol inhibited ulcer formation induced by indomethacin, alcohol or stress in rats. It increased rate of healing of ulcers caused by acetic acid or by heat coagulation. Plant extract also inhibited occurrence of alcohol-induced ulceration (*Planta Med.* 1979, *35*, 218).

MATTHIOLA (Brassicaceae)

M. incana (L.) R. Br. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 268).

Kaempferol-7-rhamnoside, kaempferol-7-glucoside, kaempferol-3-rhamnogluco-7-rhamnoside and kaempferol-3-rhamnoarabino-7-rhamnoside isolated from inflorescences (*Herba Pol.* 1976, *22*, 138; *Chem. Abstr.* 1977, *86*, 68367 f).

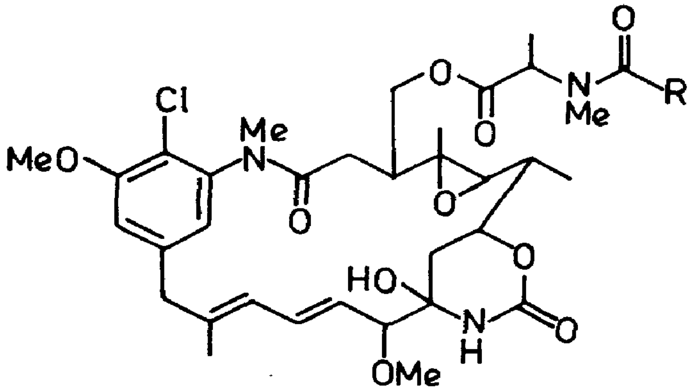
MAYTENUS (Celastraceae)

M. ovatus (Wall. ex Wt. & Arn.) Loesener syn. *Gymnosporia ovata* (W. & A.) Lawson

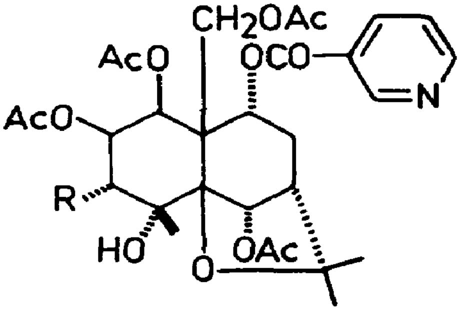
Maytoline and maytine isolated from fruits (*J. Am. Chem. Soc.* 1970, *92*, 6667); ansamacrolides - maytansin, maytanprin and maytanbutin - isolated (Ger. 2,241,418 (1972) Aug. 23; *Chem. Abstr.* 1974, *80*, 149094 t).

Distribution : The Nilgiris southwards.

NEW COMPOUNDS



Maytansin
R = Me
Maytanprin
R = Et
Maytanbutin
R = $CHMe_2$



Maytoline
R = OH
Maytine
R = H

BIOLOGICAL ACTIVITY

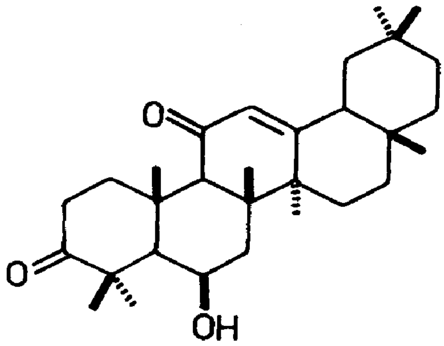
Maytansin, maytanprin and maytanbutin found useful against leukaemia (Ger. 2,241,418 (1972) Aug. 23; *Chem. Abstr.* 1974, *80*, 149094 t).

M. rothiana (Walp.) A. Callen syn. *Gymnosporia rothiana* (Walp.) Lawson.

A new triterpene - gymnosporol - isolated and characterised as 3,11-dioxo-6β-hydroxy-olean-12-ene (*Indian J. Chem.* 1970, *8*, 395).

Distribution : Western peninsular India, Konkan southwards.

NEW COMPOUNDS



Gymnosporol

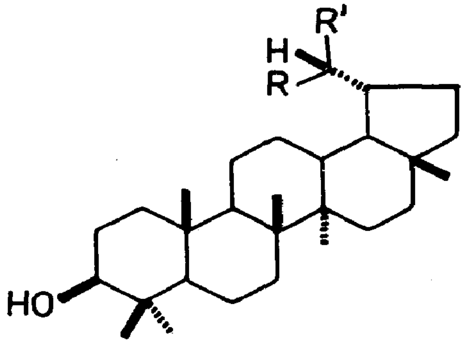
M. wallichii (G. Don) Bennet & Sahni syn. *Gymnosporia wallichiana* (W. & A.) Lawson

Two epimeric triterpenoids - gymnosporic acid (3β-hydroxy-(20R)-lupan-29-oic acid), wallichianic acid (3β-hydroxy-(20S)-lupan- 29-oic acid) - and a new diol - wallichianol

[(20S)-lupane-3β-29-diol] - isolated in addition to β-amyrin, friedelin, 3β-hydroxy-29-nor-lupan-20-one and dulcitol (*Phytochemistry* 1977, *16*, 1783).

Distribution : Western peninsula.

NEW COMPOUNDS



Wallichianol
R = Me, R' = CH_2OH
Gymnosporic acid
R = COOH, R' = Me
Wallichianic acid
R = Me, R' = COOH

MECONOPSIS (Papaveraceae)

M. napaulensis DC. syn. *M. wallichii* Hook. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 163).

Protopine, magnoflorine, cryptopine, coptisine, allocryptopine, rhoeadine, papaverrubines E and D, corysamine and 2-methyl-6-methoxy-1,2,3,4-tetrahydro-β-carboline isolated from whole plant (*Collect. Czech. Chem. Commun*. 1976, *41*, 3343).

M. wallichii Hook.; see *M. napaulensis* DC.

MEDICAGO (Papilionaceae)

M. denticulata Willd.; see *M. polymorpha* L.

M. falcata L.

Eng. - Yellow lucerne, Sickle medick.

Lutein (50-52), lutein 5,6-epoxide (16-18), chrysanthemaxanthin (9-10), flavoxanthin (7-8%) and smaller amounts of β-carotene, ζ-carotene, a hydroxy-α-carotene-like pigment, two neoxanthins, auroxanthin and a flavoxanthin-like pigment found in petals of three strains of plants (*Phytochemistry* 1972, *11*, 2581).

Distribution : Kashmir, Ladakh, Kunawar and Nepal, alt. 1500-3900 m.

M. hispida Gaertn.; see *M. polymorpha* L.

M. polymorpha L. syn. *M. denticulata* Willd., *M. hispida* Gaertn.

Eng. - Californian bur-clover, Toothed bur-clover, Toothed medick; P. — Maina; H. - Maina, Chandausi.

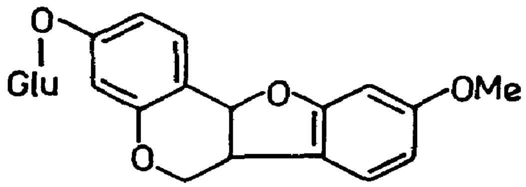
Estimation of biochanin A (0.0098) and genistein (0.016%) in plant (*Indian J. Anim. Sci.* 1975, *45*, 622; *Chem. Abstr.* 1977, *87*, 65305 u).

Distribution : Punjab, Kumaon, upper Gangetic plains, North Bengal and Madras, ascending to 1500 m in Himalayas.

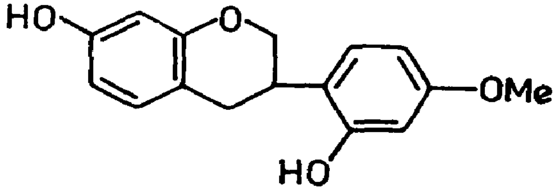
M. sativa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 269).

A highly toxic saponin (I) isolated and characterised as triglucoside of medicagenic acid (*Phytochemistry* 1971, *10*, 2221); detection of monogalactosyl (3.2), digalactosyl (7.7) and sulfoquinovosyl (0.8%) diglycerides in glyceroglycolipids from leaves by GC (*Nippon Nogei Kagaku Kaishi* 1972, *46*, 319; *Chem. Abstr.* 1972, *77*, 98736 g); a saponin isolated from roots yielded on hydrolysis hederagenin, glucose and arabinose (*Isr. J. Chem.* 1972, *10*, 881; *Chem. Abstr.* 1973, *78*, 55329 e); myrcene, limonene and linalool isolated from flowers (*Phytochemistry* 1972, *11*, 1865); a new isoflavan - sativin, mp. 125° - isolated from leaves (*Nature* 1973, *243*, 125): medicarpin-β-D-glucoside isolated from roots and its structure determined (*Agric. Biol. Chem.* 1974, *38*, 1031; *Chem. Abstr.* 1974, *81*, 87993 v); coumesterol isolated (*Indian J. Anim. Sci.* 1975, *45*, 622; *Chem. Abstr.* 1977, 87, 65305 u); benzoyl mesotartaric acid and benzoyl (S)(-)malic acid isolated (*Agric. Biol. Chem.* 1977, *41*, 2427; *Chem. Abstr.* 1978, *88*, 66010 e); α-tocopherol found predominant tocopherol isomer in alfalfa concentrate (*Izv. Akad. Nauk Kaz. SSR, Ser. Khim.* 1977, *27*, 42; *Chem. Abstr.* 1978, *88*, 65893 e).

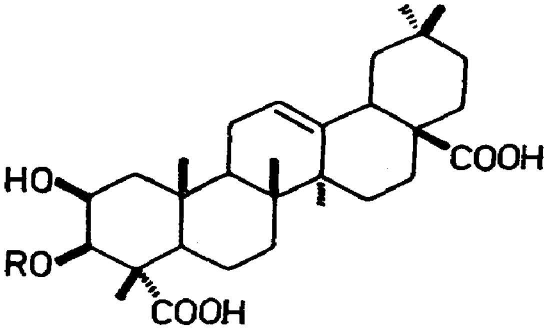
NEW COMPOUNDS



Medicarpin-β-D-glucoside



Sativin



I

R = Glu(3→1)Glu(6→1)Glu

BIOLOGICAL ACTIVITY

Sativin showed antifungal activity against *Cladosporium cucumerinum* (*Nature* 1973, *243*, 125).

MELALEUCA (Myrtaceae)

M. leucadendron (L.) L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 163).

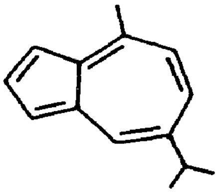
Betulin, friedelin, uvaol, sitosterol, epitaraxeryl acetate and taraxastenone isolated from leaves and stems (*Phytochemistry* 1976, *15*, 563).

MELANORRHOEA (Anacardiaceae)

M. usitata Wall. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 163).

Two sesquiterpene hydrocarbons - calarene and α-gurjunene - along with 4-methyl-7-isopropylazulene isolated (*Shikizai Kyokaishi* 1970, *43*, 130; *Chem. Abstr.* 1970, *73*, 59211 e).

NEW COMPOUNDS



4-Methyl-7-isopropylazulene

MELIA (Meliaceae)

M. azadirachta L.; see *Azadirachta indica* (L.) A. Juss.

M. birmanica Kurz

β-Sitosterol glucoside and nimbolin A isolated from heartwood (*Indian J. Chem.* 1979, *17*B, 177).

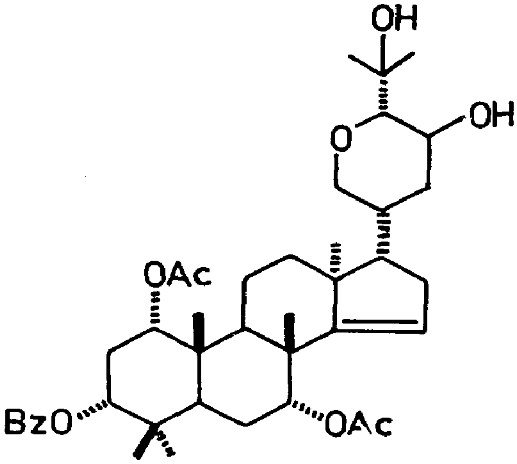
Distribution : Indigenous to Burma, introduced in Indian gardens.

M. composita Willd.; see *M. dubia* Cav.

M. dubia Cav. syn. *M. composita* Willd. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 271).

A triterpenoid (I) isolated from heartwood and its structure determined (*Indian J. Chem.* 1978, *16*B, 825).

NEW COMPOUNDS



I

M. indica Brandis; see *Azadirachta indica* (L.) A. Juss.

MELIANTHUS (Sapindaceae)

M. major L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 164).

Cyclolaudenol, sitosterol, its glucoside and queretaroic-30-caffeate isolated from aerial parts (*Phytochemistry* 1976, *15*, 430).

MELILOTUS (Papilionaceae)

M. indica (L.) All. (*indicus*) syn. *M. parviflora* Desf. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 164).

Benzo-1,2-pyrone isolated from leaves and flowers (*Rev. Bras. Farm.* 1976, *57*, 111; *Chem. Abstr.* 1977, *86*, 167900 f).

M. officinalis (L.) Medik. ex Desr. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 164).

BIOLOGICAL ACTIVITY

Coumarin (30 mg/kg/day, i.m.) antagonised marked deterioration of conditioned reflex activity induced in rats by subconvulsant doses of isoniazid (100 mg/kg, i.p.). It also antagonised convulsant doses of isoniazid (*Arzneim. Forsch.* 1970, *20*, 1620); coumarin showed a marked effect on heart and circulation in dogs; it increased capillary blood flow in organs in myocardium and in striated muscles. It had a favourable effect on myocardial ischemia induced by temporary clamping of a coronary artery (*Arzneim. Forsch.* 1970, *20*, 1630); coumarin applied to isolated guinea pig lymph vessels had a clear myotropic effect. Pulse rate and vessel amplitude and tone were increased and vessel rhythm was activated. It also had a rhythmic effect on hypotonic lymph vessels (*Arzneim. Forsch.* 1971, *21*, 852).

M. parviflora Desf.; see *M. indica* (L.) All.

MELIOSMA (Sabiaceae)

M. pungens Hook.f.; see *M. simplicifolia* (Roxb.) Walp. ssp. *pungens* (Wall. ex W. & A.) Beusekom

M. simplicifolia (Roxb.) Walp.

B. - Dibru, Dantrangi; Nep. - Patpate, Chiwari; Assam - Thowthowa, Larubandha; Tam. - Cembavu, Kallavi.

O-Acetyl oleanolic aldehyde and O-acetyl oleanolic acid isolated from stem bark (*Indian J. Chem*. 1977, *15*B, 291).

Distribution : Nepal, north-east India and Deccan Peninsula ascending to 1500 m.

M. simplicifolia (Roxb.) Walp. ssp. *pungens* (Wall. ex W. & A.) Beusekom syn. *M. pungens* (non sensu Hook.f.), *M. wightii* Planch. ex Brandis

Plant extract showed hypotensive activity (*Indian Drugs* 1979, *16*, 188).

O-Acetyl oleanolic aldehyde, erythrodiol-3-acetate and acetyl oleanolic acid isolated along with β-sitosterol and stigmasterol (*Indian Drugs* 1979, *16*, 188).

Distribution : South-west peninsular India.

M. wightii Planch. ex Brandis; see *M. simplicifolia* (Roxb.) Walp. ssp. *pungens* (Wall. ex W. & A.) Beusekom

MELOCHIA (Sterculiaceae)

M. corchorifolia L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 164).

A melocorin isolated along with hibifolin and trifolin and characterised as 3,4',5,7-tetrahydroxy-8-O-β-D-glucuronosylflavone (herbacetin-8-O-glucuronide) (*Indian J. Chem*. 1977, *15*B, 1045).

MELOTHRIA (Cucurbitaceae)

M. heterophylla (Lour.) Cogn.; see *Solena amplexicaulis* (Lamk.) Gandhi

M. maderaspatana (L.) Cogn.; see *Mukia maderaspatana* (L.) Roem.

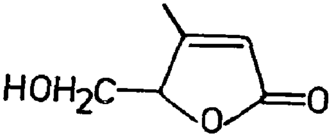
MEMECYLON (Melastomataceae)

M. edule Roxb.; see *M. umbellatum* Burm.f.

M. umbellatum Burm.f. syn. *M. edule* Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 165).

Isolation and characterisation of umbelactone; β-amyrin, sitosterol, its glucoside, oleanolic and ursolic acids also isolated (*Phytochemistry* 1978, *17*, 1663).

NEW COMPOUNDS



Umbelactone

MENTHA (Lamiaceae)

M. aquatica L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 165).

Viridiflorol (1.2%) isolated from essential oil (*Shinshu Daigaku Nogakubu Kiyo* 1976, *13*, 89; *Chem. Abstr.* 1977, *87*, 28840 u); luteolin, its 7-rutinoside, 7-β-D-glucopyranoside, hesperidin, acacetin, its 7-rutinoside, apigenin, its 7-rutinoside, 7-β-D-glucopyranoside, hesperetin-7-β-D-glucopyranoside, eriodictyol- 7-rutinoside and eriodictyol-7-β-D-glucopyranoside isolated (*Rocz. Chem.* 1977, *51*, 701; *Chem. Abstr.* 1977, *87*, 98785 d); detection of menthofuran, menthone, menthol and menthyl acetate in essential oil by GC (*Istanbul Univ. Eczacilik Fak. Mecm.* 1977, *13*, 178; *Chem. Abstr.* 1978, *88*, 148951 y).

M. arvensis L. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 165).

Alcoholic extract of leaves at a dose of 100 mg/kg and 500 mg/kg showed 80 and 100% inhibition of implantation in female rats (*Indian J. Med. Res.* 1974, *62*, 831); alcoholic extract of leaves also showed encouraging anti-ovulatory activity in rabbits (*Indian J. Med. Res.* 1974, *62*, 1225).

Acacetin, apigenin, diosmetin, eriodictyol, hesperitin and luteolin isolated from aerial parts of Polish herb (*Acta Pol. Pharm.* 1978, *35*, 673; *Chem. Abstr.* 1979, *91*, 52725 p).

M. arvensis L. var. *piperascens* Holmes

Eng.- Japanese mint.

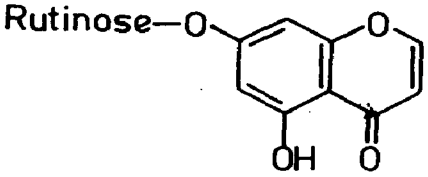
Detection of α-pinene, β-pinene, limonene, octan-3-ol, menthion, neomenthol, l-menthol, isomenthol, pulegone and piperitone in essential oil by GLC (*J. Nat. Res. Counc. Thailand* 1977, *9*, 1; *Chem. Abstr.* 1979, *91*, 120334 n).

Distribution : Introduced from Japan and cultivated in Jammu & Kashmir, alt. 270-1500 m.

M. longifolia (L.) Huds. syn. *M. sylvestris* L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 165).

Luteolin-7-glucoside, luteolin-7-glucuronide and 7-rutinosides of apigenin, acacetin, eriodictyol, hesperetin and luteolin isolated (*Planta Med.* 1973, *24*, 304); isolation of 7-β-(6-O-rhamnopyranosyl-D-glucopyranosyloxy)-5-hydroxychromone (I) (*Arch. Pharm.* 1974, *307*, 131; *Chem. Abstr.* 1974, *80*, 133751 u).

NEW COMPOUNDS



I

M. piperita L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 272).

Viridiflorol (0.15%) isolated from essential oil (*Shinshu Daigaku Kiyo* 1976, *13*, 89; *Chem. Abstr.* 1977, *87*, 28840 u; *Dragoco Rep.* 1977, *24*, 230; *Chem. Abstr.* 1978, *88*, 141478 r); methofuran, menthone, isomenthone, menthol, isomenthol, neomenthol, neoisomenthol, pulegone, piperitone, α-pinene, β-pinene, cineole and carvone isolated from eight varieties of essential oils (*Ann. Inst. Cercet. Cereale Plante Teh.-Fundulea. Acad. Stiinte Agr. Silvice* 1977, *42*, 409; *Chem. Abstr.* 1978, *89*, 185902 z).

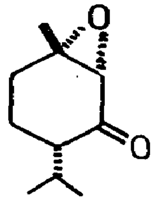
M. pulegium L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 272).

Detection of α-pinene, β-pinene, limonene, p-cymene, menthone, isomenthone, pulegone, isopulegone, methofuranoxide, piperitone, caryophyllene, β-humulene, 3-methylcyclohexanone, 3-octanone,3-octanol and 3-octyl acetate in essential oil by GLC (*Nippon Nogei Kagaku Kaishi* 1972, *46*, 303; *Chem. Abstr.* 1972, *77*, 105503 j; *Riv. Ital. Essenze, Profumi, Piante Offic. Aromi, Saponi, Cosmet., Aerosol* 1977, *59*, 541; *Chem. Abstr.* 1978, *88*, 94668 r).

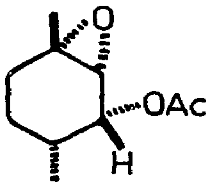
M. rotundifolia (L.) Huds. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 273).

(-)Piperitone oxide and 1,2-epoxymenthyl acetate isolated; absolute configuration of (-) piperitone oxide determined (*Agric. Biol. Chem.* 1973, *37*, 2675: *Chem. Abstr.* 1974, *80*, 83272 r); piperitenone (2.1-2.3), piperitenone oxide (83.5-87.5) and limonene (1.0-2.6%) from essential oil (*Nippon Nogei Kagaku Kaishi* 1977, *51*, 699; *Chem. Abstr.* 1978, *88*, 141477 q); detection of carvone, pulegone, menthone, isomenthone, cineole, limonene, valeric acid, o-cresol and p-cresol in essential oil by GLC (*Arch. Bioquim. Quim. Farm.* 1977, *20*, 85: *Chem. Abstr.* 1979, *91*, 181257 m).

NEW COMPOUNDS



Piperitone oxide



1,2-Epoxymenthyl acetate

M. spicata L. syn. *M. viridis* L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 165).

Diosmetin and diosmin isolated from leaves (*Phytochemistry* 1972, *11*, 452).

M. sylvestris L.; see *M. longifolia* (L.) Huds.

M. verticillata L.

Acacetin, apigenin, diosmetin, eriodictyol, hesperidin and luteolin isolated from aerial parts of Polish herb (*Acta Pol. Pharm.* 1978, *35*, 673; *Chem. Abstr.* 1979, *91*, 52725 p).

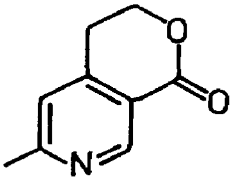
M. viridis L.; see *M. spicata* L.

MENYANTHES (Gentianaceae)

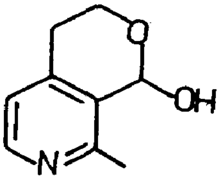
M. trifoliata L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 273).

Gentianine, mp. 81°, gentianidine, mp. 129°, gentialutine, mp. 129° and gentiatibetine, mp. 160°, isolated from leaves (*Rocz. Chem.* 1969, *43*, 1831; *Chem. Abstr.* 1970, *72*, 67158 n); detection of scopoletin, caffeic and ferulic acids by TLC (*Fitoterapia* 1972, *43*, 134); level of rutin 0.32-0.93 and that of hyperoside 0.41-1.15% in leaves (*Khim. Prir. Soedin.* 1976, *12*, 106; *Chem. Abstr.* 1976, *85*, 43688 c).

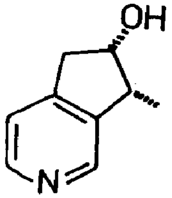
NEW COMPOUNDS



Gentianidine



Gentiatibetine



Gentialutine

MERREMIA (Convolvulaceae)

M. aegyptia (L.) Urban syn. *Ipomoea pentaphylla* (L.) Jacq.

Ergoline and clavine present in seeds; total alkaloids estimated as 0.006% (*Indian J. Pharm.* 1974, *36*, 44).

Distribution : Gujarat and western Deccan Peninsula.

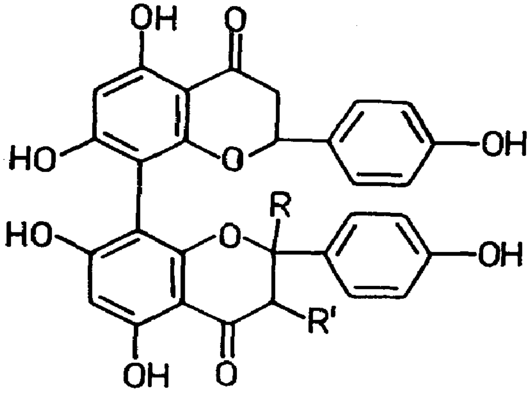
MESUA (Glusiaceae)

M. ferrea L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 273).

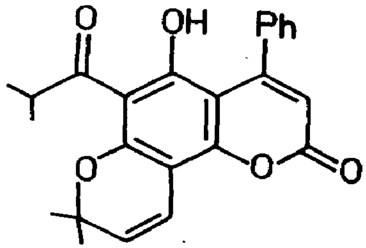
Mammeisin isolated from seeds (*Indian J. Chem.* 1968, *7*, 1278); a new 4-phenylcouma - rin - mesuagin - isolated from seed oil and characterised (*J. Org. Chem.* 1969, *34*, 3784); mammeigin and mesuol isolated from seed oil (*Phytochemistry* 1971, *10*, 1131); a new biflavanone - mesuaferrone A - isolated from stamens and characterised as 8,8'-binaringenin (*IUPAC Symp. Natural Products,* Delhi, (B-25, Polyphenolics) 1972, 115: *Indian J. Chem.* 1978,

*16*B, 167); structure elucidation of another biflavone - mesuaferrone B - isolated from stamens (*Tetrahedron Lett.* 1976, 4509).

NEW COMPOUNDS



Mesuaferrone A
R,R′ = H
Mesuaferrone B
R,R′ = Δ



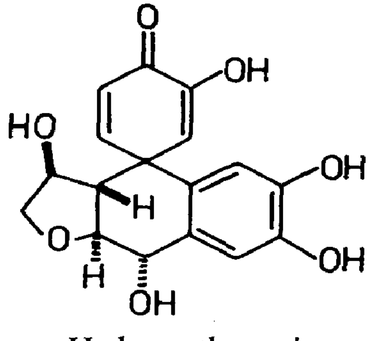
Mesuagin

METASEQUOIA (Taxodiaceae)

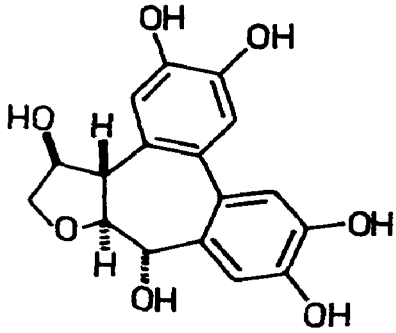
M. glyptostroboides Hu & Cheng (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, p. 274).

Hinokiflavone, isocryptomerin, sotetsuflavone, sciadopitysin, amentoflavone and amentoflavone-4′′,7′′-dimethyl ether isolated from autumn leaves (*Phytochemistry* 1971, *10*, 2465); a new diterpene characterised as 3-acetoxylabda-8(20),13-dien-15-oic acid (I), isolated from leaves along with methyl communate (*Tetrahedron* 1977, *33*, 145); agatharesinol and metasequirin A isolated from heartwood; structure of metasequirin A determined (*Mokuzai Gakkaishi* 1977, *23*, 579; *Chem. Abstr.* 1978, *88*, 71421 r); athrotaxin and three new norlignans - hydroxyathrotaxin, metasequirin B and hydroxymetasequirin A - isolated and characterised (*Mokuzai Gakkaishi* 1977, *23*, 579, 587; *Chem. Abstr.* 1978, *88*, 71421 r, 71422 s).

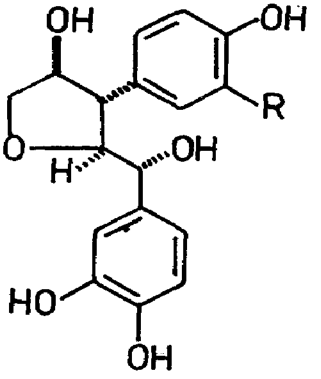
NEW COMPOUNDS



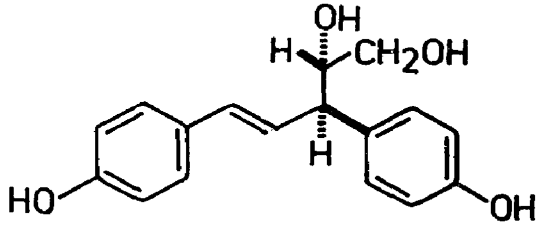
Hydroxyathrotaxin



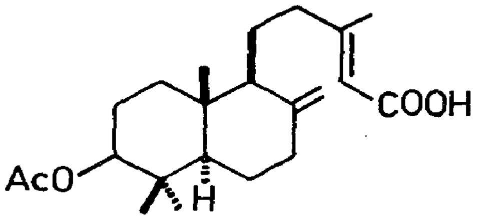
Metasequirin B



Hydroxymetasequirin A
R = OH
Metasequirin A
R = H



Agatharesinol



I

MICHELIA (Magnoliaceae)

M. cathcartii Hook.f. & Thoms.; see *Alcimandra cathcartii* (Hook.f. & Thoms.) Dandy

M. doltsopa Buch.-Ham. ex DC. syn. *M. excelsa* (Wall.) Blume
Nep.- Bara champ, Safed champ; Lepcha - Sigugrip, Pendêre; Khasi - Dieng-rai.

Lanuginosine, michelanugine, liriodenine and sitosterol isolated from leaves, root bark and trunk bark (*Phytochemistry* 1973, *12*, 2305).

Distribution : Himalayas from Nepal to Bhutan and Khasi Hills, upto 2400 m. It is reported to be cultivated in Darjeeling, Nilgiris and forests of Assam plains.

M. excelsa (Wall.) Blume; see *M. doltsopa* Buch.-Ham. ex DC.

M. lanuginosa Wall.; see *M. velutina* DC.

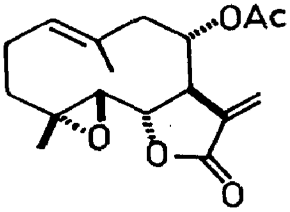
M. velutina DC. syn. *M. lanuginosa* Wall.
Nep. - Gogoi-champ; Lepcha - Phurse, Guay-champ; Khasi - Dieng- lali.

Lanuginosine, michelanugine, liriodenine and sitosterol isolated from leaves, root bark and trunk bark (*Phytochemistry* 1973, *12*, 2305; *Tetrahedron* 1975, *31*, 1105); parthenolide and a new germacranolide - 11,13-dehydrolanuginolide - isolated from trunk bark (*Phytochemistry*

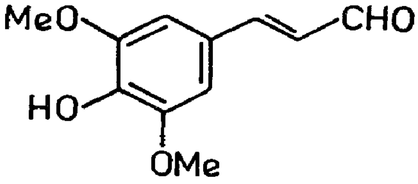
1973, *12*, 1827); structure of dihydroparthenolide, lanuginolide and sinapaldehyde isolated from trunk bark (*J. Indian Chem. Soc.* 1978, *55*, 1152).

Distribution : Himalayas from Nepal to Bhutan and Khasi Hills, alt. 1500-2100 m.

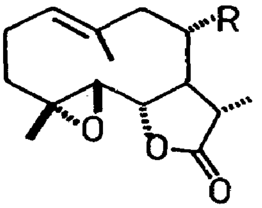
NEW COMPOUNDS



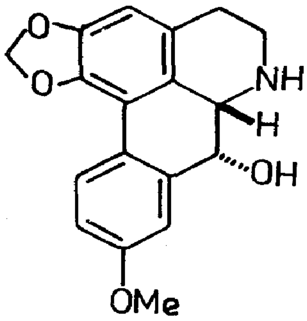
11,13-Dehydrolanuginolide



Sinapaldehyde



Dihydroparthenolide
R = H
Lanuginolide
R = OAc



Michelanugine

MICROMELUM (Rutaceae)

M. integerrimum (Buch.-Ham. ex Colebr.) W. & A. ex M. Roem. syn. *M. pubescens* auct. (non Blume) (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 275).

β-Sitosterol and hydrocarbons found in plant (*Phytochemistry* 1971, *10*, 2247); a new coumarin, mp. 139°, isolated and its structure determined as 6-(2,3-dihydroxy-3-methylbutyl)-7-methoxycoumarin (I) (*Indian J. Chem.* 1975, *13*, 772).

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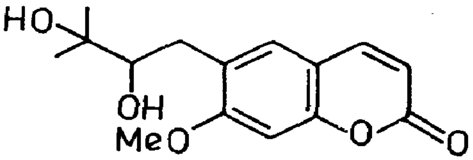


I

M. pubescens Blume; see *M. integerrimum* (Buch.-Ham. ex Colebr.) W. & A. ex M. Roem.

MICROSTYLIS (Orchidaceae)

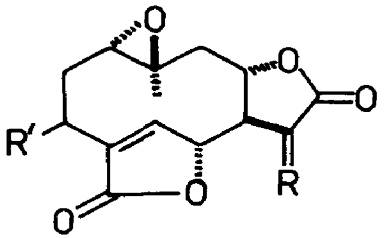
M. wallichii Lindl.; see *Malaxix acuminata* D. Don forma *acuminata*

MIKANIA (Asteraceae)

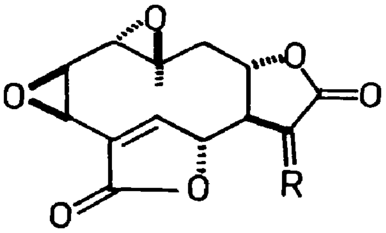
M. cordata (Burm.f.) R. L. Robinson syn. *M. scandens* Hook.f. (non Willd.) (*Compend. Indian Med. Plants*, Vol 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 275).

Six new sesquiterpene dilactones - mikanolide, dihydromikanolide, deoxymikanolide, scandenolide, dihydroscandenolide and miscandenin - isolated from aerial parts (*J. Org. Chem.* 1970, *35*, 1453); crystal structure of mikanolide (*J. Chem. Soc.* Perkin 2 1974, 1355); three new labdanic acid derivatives (I-III), two kaurenic acid derivaties (IV-V) and four new germacranolides (VI-IX) isolated and their structures determined (*Phytochemistry* 1978, *17*, 483).

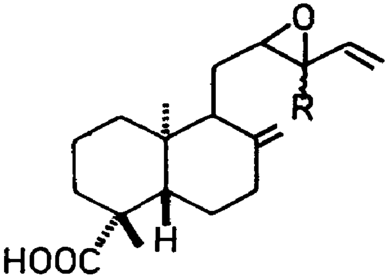
NEW COMPOUNDS



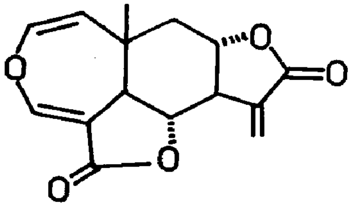
Dihydroscandenolide
R = Me,H, R′ = α-OAc
Deoxymikanolide
R = CH_2, R′ = H



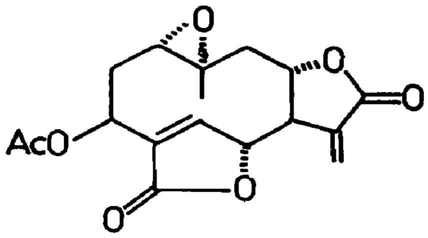
Mikanolide
R = CH_2
Dihydromikanolide
R = α-Me,H



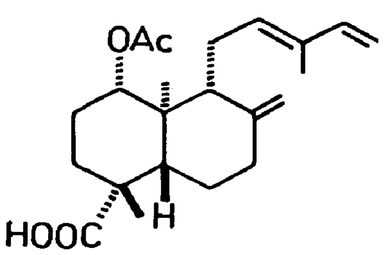
II
R = α-Me
III
R = β-Me



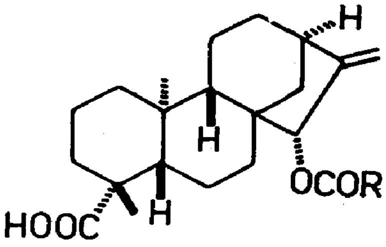
Miscandenin



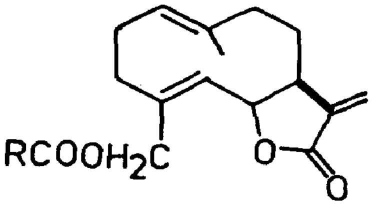
Scandenolide



I



IV
R = $CHMe_2$
V
R = Ph



VI
R = 2-Me-2-Oxiranyl
VII
R = $C(CH_2OH)=CH_2$
VIII
R = $CHMeCH_2OH$
IX
R = $CMe(OH)CH_2OH$

M. scandens Hook.f.; see *M. cordata* (Burm.f.) R. L. Robinson

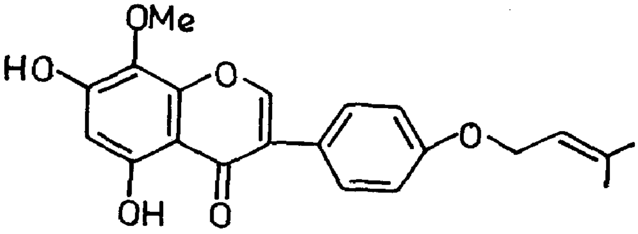
MELLETTIA (Papilionaceae)

M. auriculata Baker ex Brand.; see *M. extensa* (Benth.) Baker

M. extensa (Benth.) Baker syn. *M. auriculata* Baker ex Brand. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 276).

A new isoflavone - aurmillone - isolated from seeds and its structure elucidated (*Phytochemistry* 1978, *17*, 1065).

NEW COMPOUNDS



Aurmillone

M. ovalifolia Kurz; see *M. peguensis* Ali

M. pachycarpa Benth. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 167).

Detection of friedelin, friedelan-3β-ol and a mixture of campesterol, stigmasterol and sitosterol in leaves and stems (*Phytochemistry* 1973, *12*, 474).

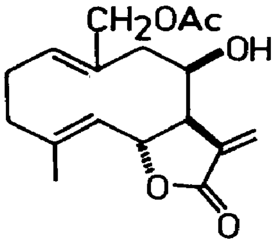
M. peguensis Ali syn. *M. ovalifolia* Kurz

Lanceolatin B, milletenins A, B and C, ovalifolin and milletenone isolated (*Tetrahedron* 1974, *30*, 2811); prenylated flavanones - 7-hydroxy-6,8-di-C-prenylflavanone (I) and 7-

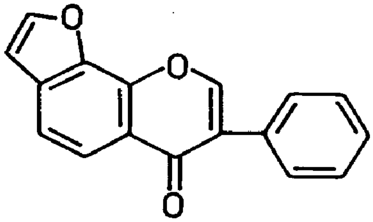
hydroxy-8-C-prenylflavanone (II) - isolated (*Phytochemistry* 1976, *15*, 832); isolation and structure elucidation of new pyranoflavanone - ovalichromene - from seeds (*Phytochemistry* 1976, *15*, 1795); structures assigned to two new chromenoflavones - ovalichromene A and ovalichromene B - isolated from seeds along with chromenochalcone (*Phytochemistry* 1976, *15*, 2011); ovalichalcone isolated and its structure established (*Phytochemistry* 1977, *16*, 293); ovalitenin A, ovalitenin B and ovalitenone isolated from seeds and characterised (*Phytochemistry* 1977, *16*, 1104).

Distribution : Native of Burma, grown in gardens in India.

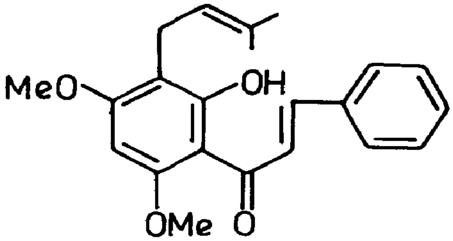
NEW COMPOUNDS



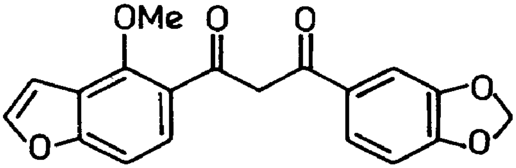
Ovalifolin



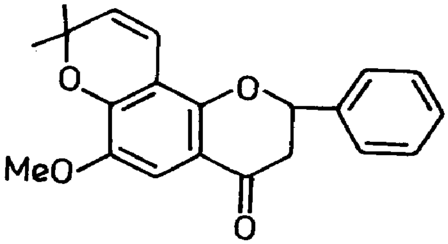
Lanceolatin



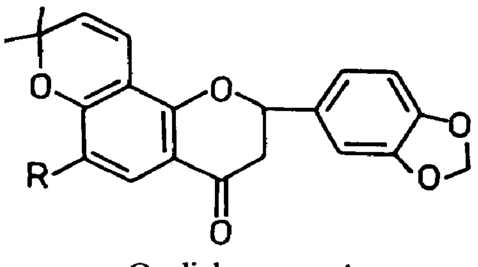
Ovalichalcone



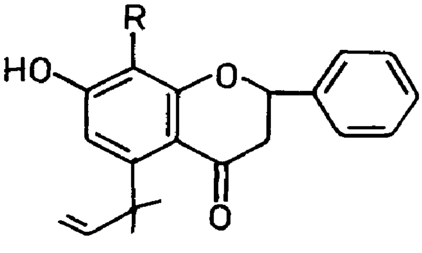
Ovalitenone



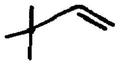
Ovalichromene



Ovalichromene A
R = OMe
Ovalichromene B
R = H

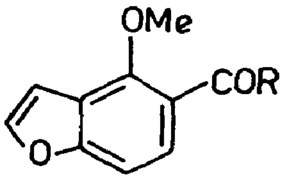


I

R = 

II

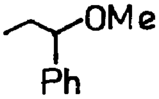
R = H



Ovalitenin A

R =

Ovalitenin B

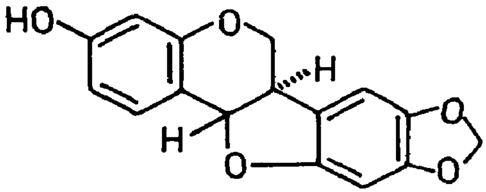
R = 

M. pendula (Grah.) Benth. ex Baker

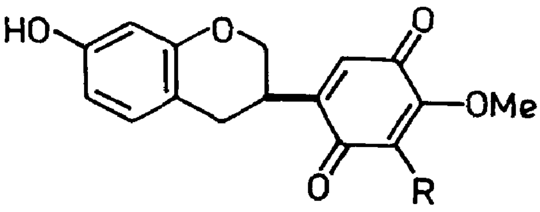
Ethyl 3,4,5-trimethoxybenzoate, sitosterol, its glucoside, gallic acid, ellagic acid and ethyl gallate isolated from seeds (*Nat. Acad. Sci. Lett.* 1978, *1*, 368 ; *Chem. Abstr.* 1979, *90*, 164724 y); in addition to equol (-)maackiain claussequinone, a new compound - pendulone isolated - from heartwood; pendulone characterised as 7-hydroxy-3′,4′-dimethoxyisoflavanquinone (*Mokuzai Gakkaishi* 1978, *24*, 898; *Chem. Abstr.* 1979, *90*, 100111 p.).

Distribution : Found in Burma. Reported to be grown in Forest Research Institute, Dehradun.

NEW COMPOUNDS



(-)Maackiain



Claussequinone
R = H
Pendulone
R = OMe

M. racemosa Benth.

H.- Jungi; Tel. - Galuga.

Sitosterol and stigmasterol isolated from bark and roots (*Indian J. Chem.* 1977, *15*B, 291).

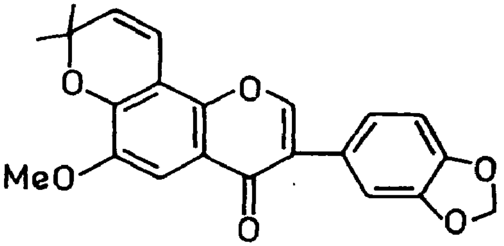
Distribution : Orissa and Deccan Peninsula.

M. rubiginosa Wt. & Arn.

Durmillone, rotenone and ichthynone isolated from seeds (*Indian J. Chem.* 1977, *15*B, 291).

Distribution : Courtallum in Kerala.

NEW COMPOUNDS



Durmillone

MILLINGTONIA (Bignoniaceae)

M. hortensis L.f.

Eng. - Indian cork tree; H. - Neem-chameli, Akas-nim; B. - Corkgach; Mar. - Kavalo-nimb, Nimi chambeli; Tel. - Kavuki; Tam. - Maramalli; Kan. - Beratu; Mal. - Katesam; Oriya - Bakeni, Redli, Mach-mach, Sitahara.

n-Hentriacontanol and β-sitosterol isolated from bark (*J. Indian Chem. Soc.* 1973, *50*, 561).
Distribution : Grown in gardens throughout plains of India.

MIMOSA (Mimosaceae)

M. pudica L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 167).

Mucilage of seeds contained galactose and mannose in ratio of 1:1 (*Indian Drugs* 1977, *15*, 39).

MIMUSOPS (Sapotaceae)

M. elengi L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 276).

Mixture of saponins contained in bark yielded on hydrolysis β-amyrin and bassic acid (*Indian J. Appl. Chem.* 1969, *32*, 173; *Chem. Abstr.* 1971, *75*, 1296 m; *Proc. Nat. Acad. Sci.* India 1971, *41*, 21: *Chem. Abstr.* 1972, *77*, 123778 g); myricetin-3-O-L-rhamnoside and myricetin-3-O-β-D-galactoside isolated from leaves (*Curr. Sci.* 1973, *42*, 746); D-mannitol, β-sitosterol and its glucoside isolated from flowers (*Indian J. Chem.* 1976, *14*B, 818).

M. hexandra Roxb.; see *Manilkara hexandra* (Roxb.) Dubard

M. littoralis Kurz; see *Manilkara littoralis* (Kurz) Dubard

M. manilkara G. Don; see *Manilkara zapota* (L.) P. van Royen

MIRABILIS (Nyctaginaceae)

M. jalapa L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 276).

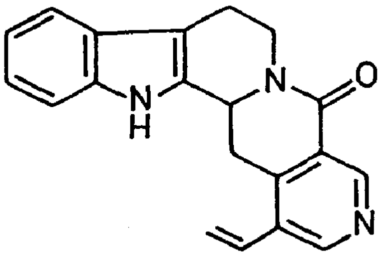
Tricosan-12-one, n-hexacosanol, β-sitosterol and tetracosanoic acid isolated whereas tartaric acid, citric acid, leucine, valine tryptophan, alanine and glycine detected in leaves by PC (*Collect. Czech. Chem. Commun.* 1976, *41*, 295).

MITRAGYNA (Rubiaceae)

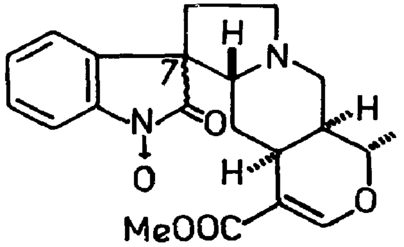
M. parvifolia (Roxb.) Korth. syn. *Stephegyne parvifolia* (Roxb.) Korth. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 277).

Tetrahydroalstonine, akuammigine, pteropodine, isopteropodine, speciophylline and uncarine F isolated from leaves, while isorhynchophylline and rhynchophylline isolated from root bark; all of them present in trunk bark (*J. Pharm. Pharmacol.* 1971, *23*(S), 245); seasonal variation of rhynchophylline, isomitraphylline, hirsutine and dihydrocorynantheine present in leaves, stem, bark and root bark analysed; new leaves (June) had no mitraphylline but it became dominant alkaloid during July. It was major constituent in stem bark during August and November (*Planta Med.* 1972, *21*, 263); corynantheidol (allo) and dihydrocorynantheol (normal) isolated from leaves of Sri Lankan plant (*Planta Med.* 1973, *24*, 13); angustine isolated from leaves and its structure determined (*Phytochemistry* 1974, *13*, 973); four alkaloidal N-oxides - speciophylline N-oxide, uncarine F N-oxide, akuammigine N-oxide and dihydrocorynantheol N-oxide - along with akuammigine, tetrahydroalstonine, pteropodine, isopteropodine, speciophylline, uncarine F, dihydrocorynantheol and corynantheidol isolated from leaves of Sri Lankan plant (*Planta Med.* 1974, *25*, 172).

NEW COMPOUNDS



Angustine



Speciophylline N-oxide (7α)
Uncarine F (7β)

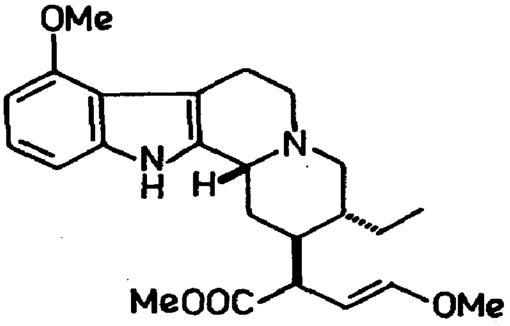
M. tubulosa (Arn.) Kuntze syn. *Stephegyne tubulosa* (Arn.) Benth. Hook.

Tam. - Naikadambu; Mal. - Malan thumba.

Mitraciliatine, rhynchociline, ciliaphylline, rotundifoline, isorotundifoline, rhynchophylline, isorhynchophylline, mitraphylline and isomitraphylline isolated from leaves (*Planta Med.* 1973, *23*, 221); 9-methoxyrhynchophylline N-oxide isolated from plant (*Phytochemistry* 1973, *12*, 2043).

Distribution : Western Peninsula.

NEW COMPOUNDS



Mitraciliatine

MITREOLA (Spigeliaceae)

M. petiolata (Gmel.) Torr. & Gray syn. *Cynoctonum mitreola* (L.) Britton
Vanillic and ferulic acids present in plant (*Curr. Sci.* 1979, *48*, 383).
Distribution : Assam, central India, Bihar, Andhra Pradesh and Maharashtra.

MOGHANIA (MAUGHANIA) (Papilionaceae)

M. macrophylla (Willd.) O. Ktze.; see *Flemingia macrophylla* (Willd.) O. Ktze. ex Merr.

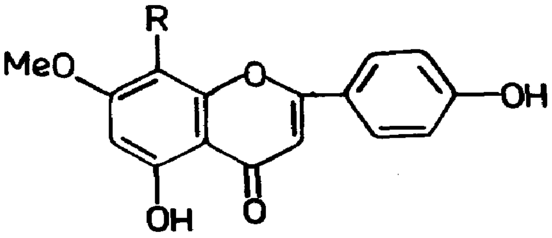
MOLLUGO (Molluginaceae)

M. distica (L.) Ser.

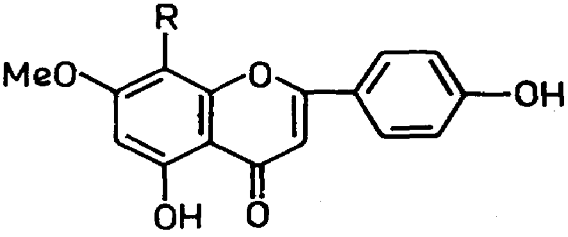
Four new C-glycosylflavones - genkwanin-8-C-β-D-glucopyranoside (I), genkwanin-8-C-α-L-arabinopyranoside (II) and their 2''-rhamnosides (III,IV) - isolated and characterised (*Phytochemistry* 1978, *17*, 299).

Distribution : South Deccan Peninsula.

NEW COMPOUNDS



I
R = Glu
II
R = Ara



III
R = Glu(2→1)Rha
IV
R = Ara(2→1)Rha

M. hirta Thunb.; see *Glinus lotoides* L.

M. spergula L.; see *Glinus oppositifolius* (L.) A. DC.

MOMORDICA (Cucurbitaceae)

M. cymbalaria Fenzl. ex Naud.; see *Luffa tuberosa* Roxb.

M. tuberosa Cogn.; see *Luffa tuberosa* Roxb.

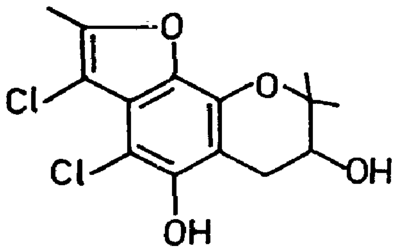
MONOTROPA (Monotropaceae)

M. hypopitys L. syn. *Hypopitys lanuginosa* auct. (non Nutt.)

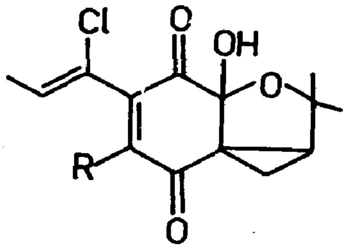
Structures of chloromycorrhizinol A, mycorrhizin A and chloromycorrhizin A isolated from roots elucidated (*Phytochemistry* 1978, *17*, 1359).

Distribution : Kashmir, alt. 2400 m and Khasia Hills alt. 1200- 1500 m.

NEW COMPOUNDS



Chloromycorrhizinol A



Mycorrhizin A
R = H
Chloromycorrhizin A
R = Cl

MORINDA (Rubiaceae)

M. angustifolia Roxb.

B. - Asho, Darh haridra; Nep. - Barr-hardi; Lepcha - Huldi-kung; Assam - Asu-goch; Khasi - Dieng-nong, Dieng-seroi; Garo - Chhennong; Lushai - Kuwnpel.

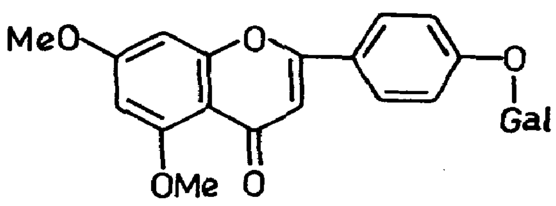
Rhein, aloe-emodin and morindone isolated from heartwood; ursolic acid and rutin isolated from leaves (*Indian J. Pharm. Sci.* 1978, *40*, 169).

Distribution : Eastern Himalayas, north-east India, Assam, Bihar, Orissa and Andhra Pradesh upto 1800 m.

M. citrifolia L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 279).

Acacetin-7-O-β-D-glucopyranoside and 5,7-di-O-methylapigenin-4'-O-β-D-galactopyranoside (I) isolated from flowers (*J. Indian Chem. Soc.* 1976, *53*, 424); glycoside (II) isolated from flowers characterised as 6,8-dimethoxy-3-methylanthraquinone-1-O-β-rhamnosyl(4→1)glucopyranoside (*J. Indian Chem. Soc.* 1977, *54*, 429); asperuloside, glucose, caprylic and caproic acids identified in ripe fruits (*Planta Med.* 1979, *36*, 186).

NEW COMPOUNDS



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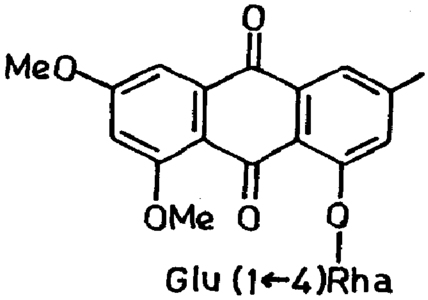


II

M. coreia Buch.-Ham.; see *M. tomentosa* Heyne ex Roth

M. tinctoria Roxb.; see *M. tomentosa* Heyne ex Roth

M. tinctoria Roxb. var. *tomentosa* (Heyne ex Roth) Hook.f.; see *M. tomentosa* Heyne ex Roth

M. tomentosa Heyne ex Roth syn. *M. tinctoria* Roxb., *M. coreia* Buch.-Ham., *M. tinctoria* Roxb. var. *tomentosa* (Heyne ex Roth) Hook.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 279).

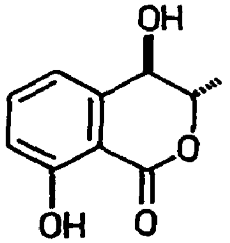
6-Primeveroside of morindone isolated from root bark (*Indian J. Chem.* 1977, *15*B, 497).

MORINGA (Moringaceae)

M. oleifera Lamk. syn. *M. pterygospermum* Gaertn. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 280).

Detection of alanine, arginine, glycine, serine, threonine, valine, glutamic and aspartic acids in flowers and fruits; lysine in flowers, sucrose and glucose in flowers and sucrose in fruits (*J. Inst. Chemists*, Calcutta, 1977, *49*, 163; *Chem. Abstr.* 1977, *87*, 197243 g); 4-hydroxymellein, vanillin, octacosanoic acid, β-sitosterol and β-sitostenone isolated from stems (*Indian J. Chem.* 1978, *16*B, 1044).

NEW COMPOUNDS



4-Hydroxymellein

M. pterygospermum Gaertn.; see *M. oleifera* Lam.

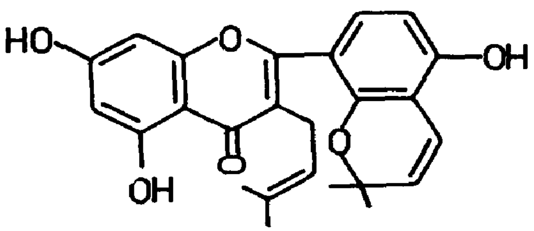
MORUS (Moraceae)

M. alba L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 280).

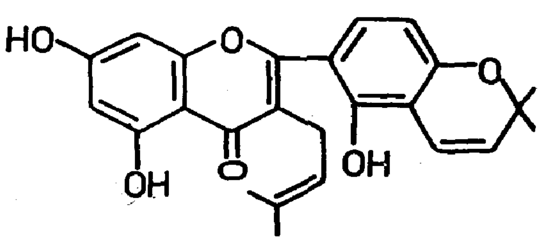
Root bark extract showed cathartic, analgesic, diuretic, antitussive, anti-oedema, sedative, anticonvulsant and hypotensive actions in mice, rats, guinea pigs and dogs (*Jap. J. Pharmacol.* 1976, *26*, 461); root bark used as diuretic, antitussive, expectorant and tonic in oriental medicine (*Planta Med.* 1977, *32*, 118).

Three new flavone derivatives - morusin, cyclomorusin and compound A - isolated from root bark and their structures determined (*Chem. Pharm. Bull.* 1976, *24*, 2898; *ibid.* 1978, *26*, 1394; *ibid.* 1978, *26*, 1431); a flavone - mulberranol - isolated from bark and a complex phenol - alboctalol - isolated from heartwood and their structures determined (*Indian J. Chem.* 1976, *14*B, 647); isolation of morusinol from root bark and its structure elucidation (*Planta Med.* 1977, *32*, 118); cis-5-hydroxy-L-pipecolic acid isolated from leaves (*Phytochemistry* 1977, *16*, 1041); four new flavones - kuwanons A,B,C and oxydihydro-morusin - isolated from root bark and characterised (*Chem. Pharm. Bull.* 1977, *25*, 529; *ibid.* 1978, *26*, 1453; *Heterocycles* 1978, *9*, 1355); isolation and structure elucidation of kuwanon D from root bark (*Heterocycles* 1978, *9*, 745); a new flavanone - kuwanon E - isolated from root bark and characterised as 2',4',5,7- tetrahydroxy-5'-geranylflavanone (*Heterocycles* 1978, *9*, 1295); a new isoprenoid 2-arylbenzofuran - mulberrofuran A - isolated from root bark and its structure determined (*Heterocycles* 1978, *9*, 1593); lipids isolated from fruits contained heptanoic (0.047), caprylic (0.21), pelargonic (0.047), capric (0.07), myristic (0.105), palmitic (11.85), palmitoleic (0.188), methyl heptadecanoic (0.14), stearic (4.46), oleic (12.67), linoleic (68.3), nonadecanoic (0.641), linolenic (0.98%) acids (*Rastit. Resur.* 1978, *14*, 585; *Chem. Abstr.* 1979, *90*, 19061 a); two phytoalexins - moracin C and moracin D - isolated from shoot (*Chem. Lett.* 1978, 1239); a new flavanone - kuwanon F - isolated and its structure determined (*Heterocycles* 1979, *12*, 943); astragalin isolated from leaves (*Nippon Nogei Kagaku Kaishi* 1979, *53*, 13; *Chem. Abstr.* 1979, *90*, 164718 z).

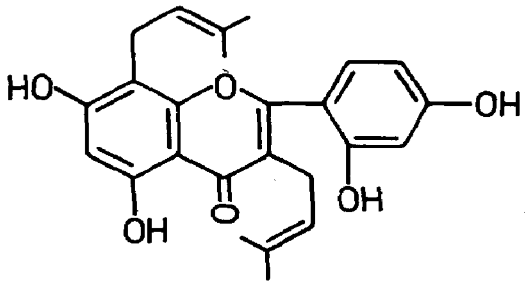
NEW COMPOUNDS



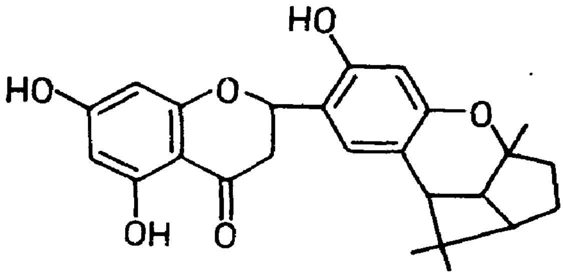
Kuwanon A



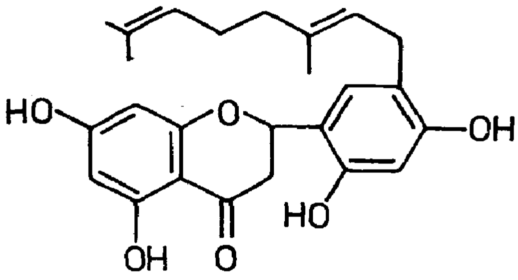
Kuwanon B



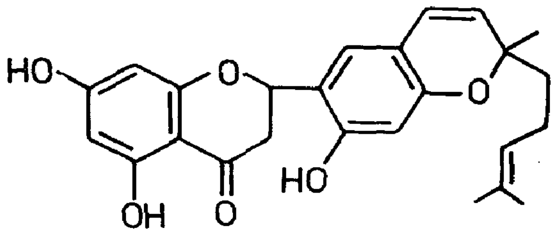
Kuwanon C



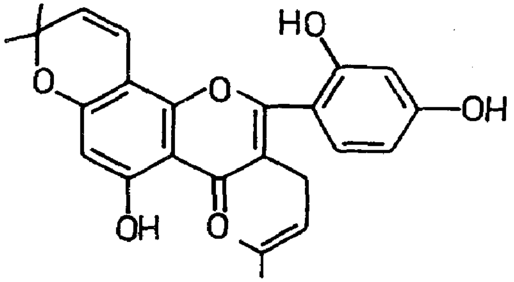
Kuwanon D



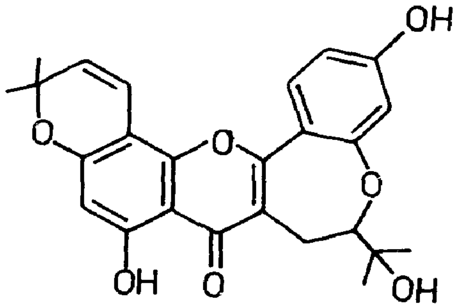
Kuwanon E



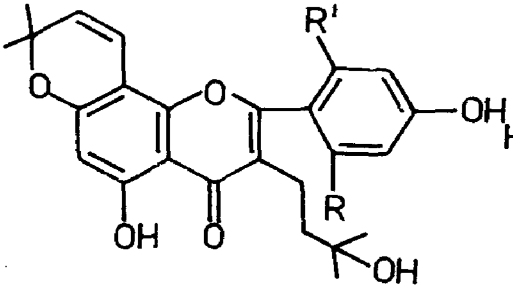
Kuwanon F



Morusin



Compound A

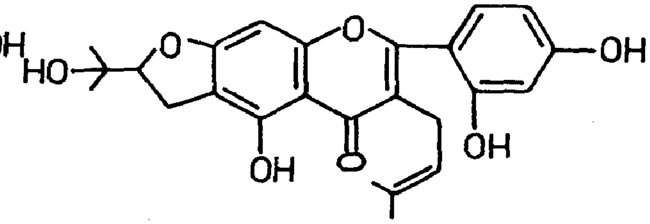


Morusinol

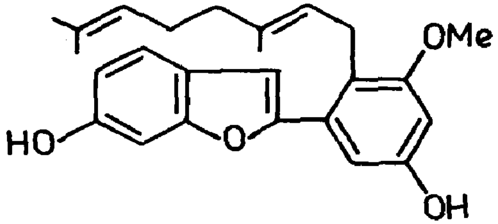
R = H, R' = OH

Oxydihydromorusin

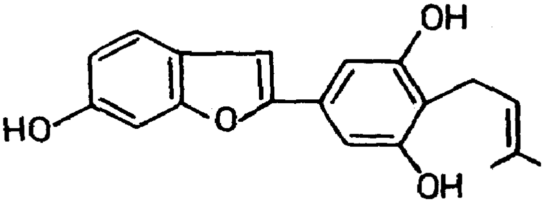
R = OH, R' = H



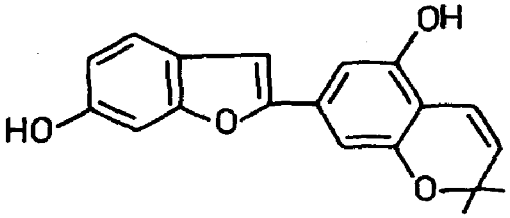
Mulberranol



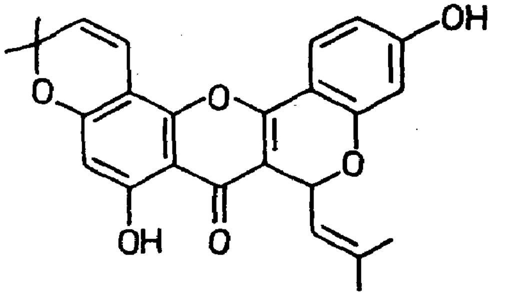
Mulberrofuran A



Moracin C



Moracin D



Cyclomorusin

BIOLOGICAL ACTIVITY

Mulberrofuran A showed antibacterial activity against *Staphylococcus aureus* and *Fusarium roseum* (*Heterocycles* 1978, *9*, 1593).

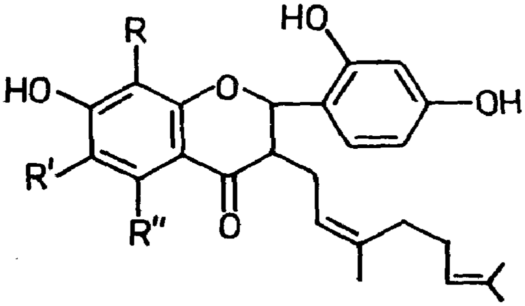
M. rubra L.

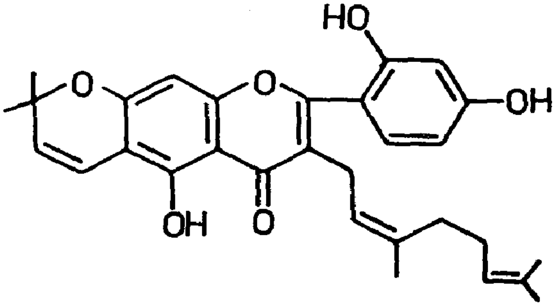
Eng. - Red mulberry.

Four new flavones - rubraflavones A,B,C and D - isolated and their structures determined (*Indian J. Chem.* 1974, *12*, 431).

Distribution : Cultivated for its edible fruits.

NEW COMPOUNDS





Rubraflavone A

R,R′,R″ = H

Rubraflavone B

R′,R″ = H, R =

Rubraflavone C

R = H, R″ = OH, R′ =

Rubraflavone D

M. serrata Roxb.

H.- Kimu, Himu, Tuti; P. — Karum, Kimu, Karttut; Khasi- Dieng- soh-tungkhar.

β-Amyrin acetate, betulinic acid, ceryl alcohol, quercetin and morin isolated from bark (*Pol. J. Pharm.* 1979, *53*, 551; *Chem. Abstr.* 1979, *91*, 35740 x).

Distribution : Punjab to Kumaon, inner ranges of Himalayas, alt. 1200-2700 m.

MUCUNA (Papilionaceae)

M. pruriens (L.) DC. syn *M. prurita* Hook. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 281).

The total indole alkylamines produced marked behavioral changes, antagonised pentabarbitone-induced hypnosis, inhibited reserpine-induced ptosis, hypothermia, chlorpromazine-induced catatonia and enhanced amphetamine toxicity in aggregated rats (*Indian J. Physiol. Allied Sci.* 1971, *25*, 53; *Chem. Abstr.* 1973, *79*, 49309 c).

M. prurita Hook.; see *M. pruriens* (L.) DC.

M. sloanei Fawcett & Rendle

L-Dopa isolated from seeds (*Curr. Sci.* 1977, *46*, 778).

Distribution : Appears to be introduced into India.

MUKIA (Cucurbitaceae)

M. maderaspatana (L.) Roem. syn. *Melothria maderaspatana* (L.) Cogn., *Mukia scabrella* Arn. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 165).

Columbin, mp. 195°, isolated from roots (*Phytochemistry* 1973, *12*, 3000).

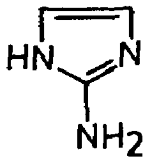
M. scabrella Arn.; see *M. maderaspatana* (L.) Roem.

MUNDULEA (Papilionaceae)

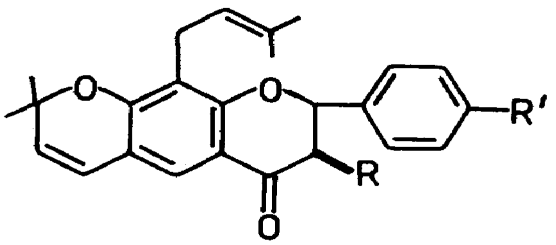
M. sericea (Willd.) A. Cheval syn. *M. suberosa* Benth. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 281).

Mundulone isolated (*Phytochemistry* 1972, *11*, 2621); 2-aminoimidazole (I) isolated from seeds, structure confirmed by synthesis (*Phytochemistry* 1977, *16*, 1399); mundulone and sericetin isolated from stem bark (*Curr. Sci.* 1977, *46*, 726); prenylated pyranoflavonoids - mundulin, mundulinol, sericone and II - isolated from bark and their structures assigned (*J. Chem. Res. Synop.* 1979, 97; *Chem. Abstr.* 1979, *91*, 140739 b).

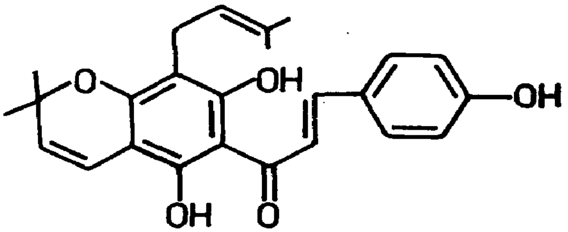
NEW COMPOUNDS



I



II
R,R' = OH
Mundulin
R,R' = H
Mundulinol
R = OH, R' = H



Sericone

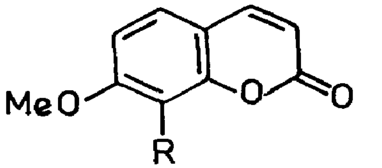
MURRAYA (Rutaceae)

M. elongata DC.

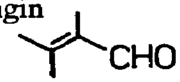
Structure elucidation of a monomeric coumarin - murralongin - isolated from leaves (*Tetrahedron Lett.* 1973, 5005); murrangatin isolated from leaves and structure assigned (*Tetrahedron* 1973, *29*, 2811).

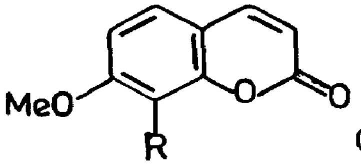
Distribution : Indigenous to Burma, introduced in some gardens of West Bengal.

NEW COMPOUNDS

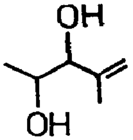


Murralongin

R = 



Murrangatin

R = 

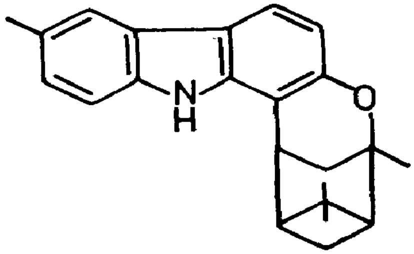
M. exotica L.; see *M. paniculata* (L.) Jack

M. koenigii (L.) Spreng. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 282).

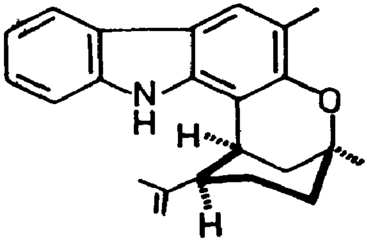
Girinimbine, mahanimbine and isomahanimbine isolated from leaves and roots (*Tetrahedron* 1970, *26*, 1475; *Phytochemistry* 1974, *13*, 2893; *Indian J. Chem.* 1975, *13*, 993); structure of murrayacine isolated from leaves and roots confirmed by synthesis (*Tetrahedron* 1970, *26*, 1475; *J. Org. Chem.* 1973, *38*, 2728); structures of mahanine, koenine, koenigine, koenidine and koenimbine isolated from leaves (*Indian J. Chem.* 1970, *8*, 473; *ibid.* 1975, *13*, 993); mahanimbicine and bicyclomahanimbicine isolated (*Chem. Ind.* 1970, 958); scopolin isolated from leaves (*Planta Med.* 1971, *19*, 83); synthesis of (±)O-methylmahanine (*Experientia* 1972, *28*, 769); a new carbazole - murrayacinine - isolated from stem bark and its structure determined (*Chem. Ind.* 1974, 165); structure of murrayazolidine isolated from stem bark, confirmed by synthesis (*Chem. Ind.* 1974, 260); structure of curryanine (murrayazolidine) and

curryangine (murrayazoline, mahanimbidine) established by synthesis (*Chem. Ind.* 1970, 593; *ibid.* 1974, 268; *Indian J. Chem.* 1976, *14*, 430); a new carbazole alkaloid - mukonine - isolated and its structure established (*Phytochemistry* 1978, *17*, 834); mukonidine isolated and characterised as 2-hydroxy-3-carbomethoxycarbazole (*J. Indian Chem. Soc.* 1978, *55*, 1114).

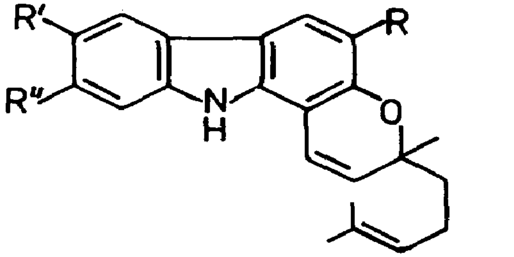
NEW COMPOUNDS



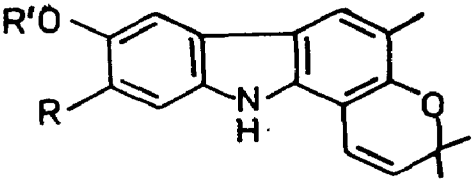
Bicyclomahanimbicine



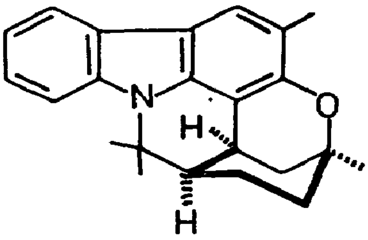
Curryanine



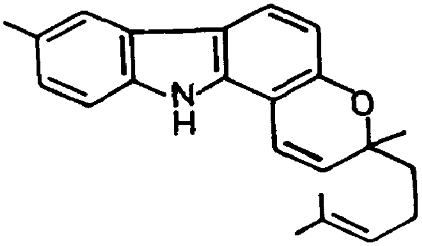
Mahanine
R = Me, R′ = H, R″ = OH
Isomahanimbine
R,R″ = H, R′ = Me
Murrayacinine
R = CHO, R′,R″ = H



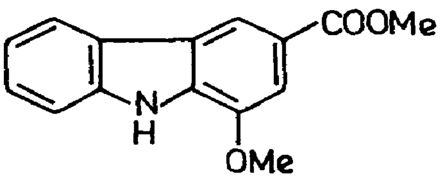
Koenine
R,R′ = H
Koenigine
R = OH, R′ = Me
Koenidine
R = OMe, R′ = Me



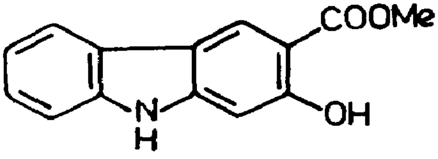
Curryangine



Mahanimbicine



Mukonine

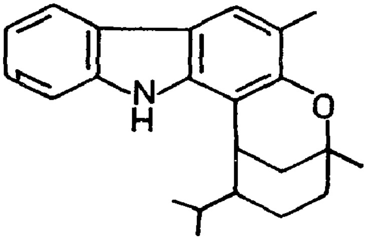


Mukonidine

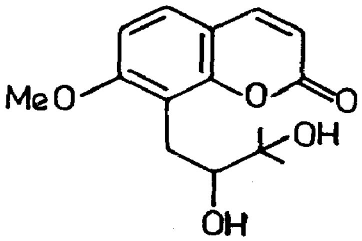
M. paniculata (L.) Jack syn. *M. exotica* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 283).

Phebalosin, mp. 122°, isolated from leaves (*Sci. Cult.* 1969, *35*, 332; *J. Res. Indian Med.* 1975, *10*, 75); 3,3′,4′,5,5′,7,8-heptamethoxyflavone (hibiscetin heptamethyl ether) isolated from leaves (*Phytochemistry* 1970, *9*, 889; *J. Indian Chem. Soc.* 1971, *48*, 80); semi-α-carotenone isolated from fruits had same chirality (6R) as (+)α-carotene (*Phytochemistry* 1970, *9*, 231; *Helv. Chim. Acta* 1970, *53*, 1210); paniculatin isolated and characterised as 7-methoxy-8-(isovaleryloxy-2-keto-3-methylbutyl) coumarin along with osthol and coumarrayin (*Can. J. Chem.* 1972, *50*, 443); another coumarin - murrayone, mp. 130° - isolated from leaves and characterised as 7-methoxy-8-(3-methyl-2-oxo-3-butenyl)coumarin (*Indian J. Chem.* 1972, *10*, 564); phebalosin hydrate, mp. 131°, isolated from leaves (*Indian J. Pharm.* 1972, *34*, 47); scopolin, scopoletin and glucose isolated from flowers and fruits (*J. Chinese Chem. Soc.* 1975, *22*, 167; *Chem. Abstr.* 1975, *83*, 144538 t); hentriacontane and octacosanol isolated from leaves (*J. Res. Indian Med.* 1975, *10*, 75); a coumarin (aurapten) isolated from leaves (*J. Indian Chem. Soc.* 1975, *52*, 1213); murralongin, murrangatin and meragin hydrate isolated from leaves (*Phytochemistry* 1976, *15*, 1787); imperatorin isolated from leaves (*Trans. Bose Res. Inst.*, Calcutta 1977, *40*, 123; *Chem. Abstr.* 1979, *90*, 19071 d); out of eight alkaloids shown by TLC in root, four identified as noracronycine, de-N-methylnoracronycine, de-N-methylacronycine and skimmianine (*Plant. Med. Phytother.* 1978, *12*, 207; *Chem. Abstr.* 1979, *90*, 83610 f); isolation of mahanimbine and murrayazoline; characterisation of murrayazoline (curryangine) (*J. Indian Chem. Soc.* 1978, *55*, 308); another carbazole alkaloid - exozoline - isolated from leaves and its structure determined (*Phytochemistry* 1978, *17*, 1816).

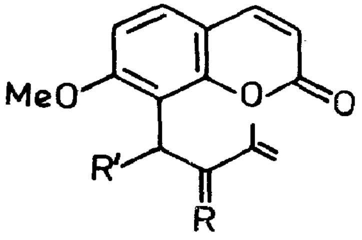
NEW COMPOUNDS



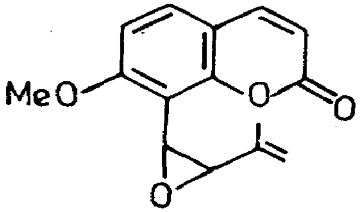
Exozoline



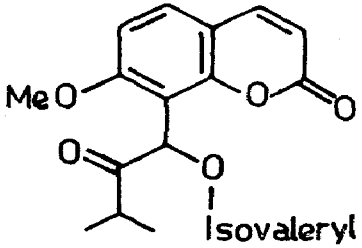
Meragin hydrate



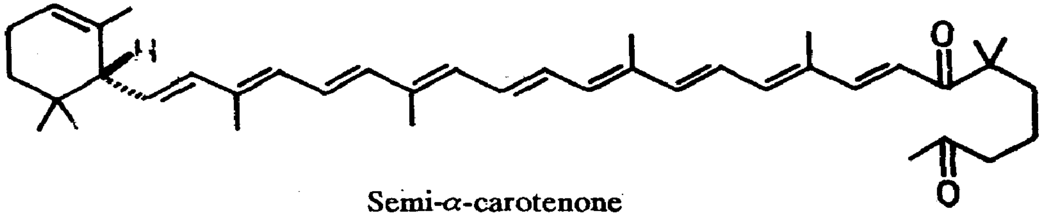
Murrayone
R = O, R′ = H
Phebalosin hydrate
R = OH, H, R′ = OH



Phebalosin



Paniculatin



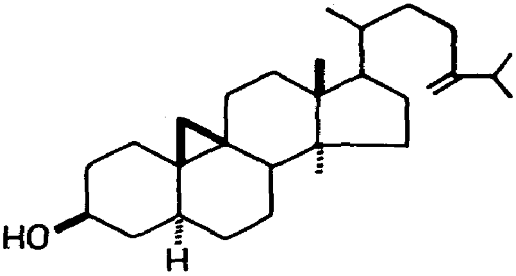
Semi-α-carotenone

MUSA (Musaceae)

M. paradisiaca L. syn. *M. sapientum* L., *M. paradisiaca* L. var *sapientum* (L.) Kuntze (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 171).

14α-Methyl-9β,19-cyclo-5α-ergost-24(28)-en-3β-ol (I) isolated (*Phytochemistry* 1972, *11*, 3497).

NEW COMPOUNDS



I

M. paradisiaca L. var. *sapientum* (L.) Kuntze; see *M. paradisiaca* L.

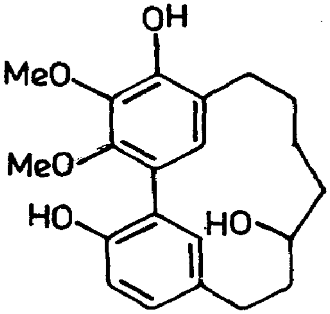
M. sapientum L.; see *M. paradisiaca* L.

MYRICA (Myricaceae)

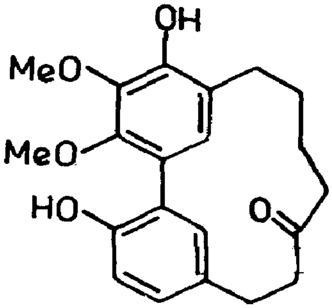
M. esculenta Buch.-Ham. syn. *M. nagi* Hook.f. (non Thunb.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 283).

New meta-bridged biphenyls - myricanol and myricanone - isolated from stem and bark and their structures elucidated (*Chem. Commun.* 1970, 1206).

NEW COMPOUNDS



Myricanol



Myricanone

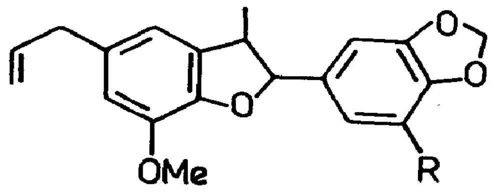
M. nagi Hook.f.; see *M. esculenta* Buch.-Ham.

MYRISTICA (Myristicaceae)

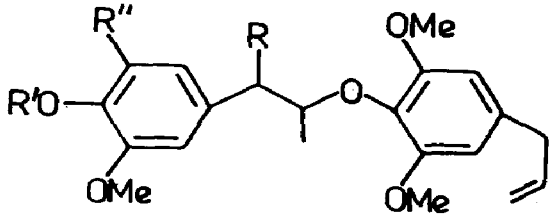
M. fragrans Houtt. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 172).

Seven new dimeric phenylpropanoids (I-VII) isolated from seeds and their structures determined (*Agric. Biol. Chem.* 1973, *37*, 193, 1479; *Chem. Abstr.* 1973, *78*, 133321 n; *ibid.* 1973, *79*, 89521 x).

NEW COMPOUNDS



I
R = H
II
R = OMe



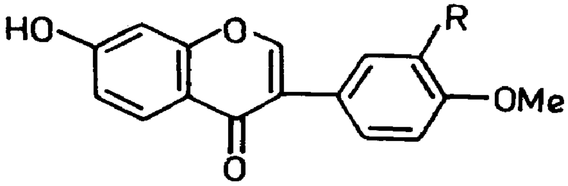
III
R = OH, R' = Me, R'' = H
IV
R = OAc, R' = Me, R'' = H
V
R = OH, R' = Me, R'' = OMe
VI
R = H, R' = Me, R'' = OMe
VII
R = OH, R',R'' = H

MYROXYLON (Papilionaceae)

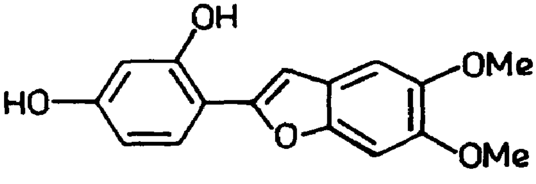
M. balsamum (L.) Harms (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 284).

Two new isoflavones - (±)7-hydroxy-4'-methoxyisoflavanone (I) and (±)-7,3'-dihydroxy-4'-methoxyisoflavanone (II) - and a benzofuran - 2-(2',4'-dihydroxyphenyl)-5,6-dimethoxybenzofuran (III) - isolated from trunk wood (*Phytochemistry* 1978, *17*, 593).

NEW COMPOUNDS



I
R = H
II
R = OH



III

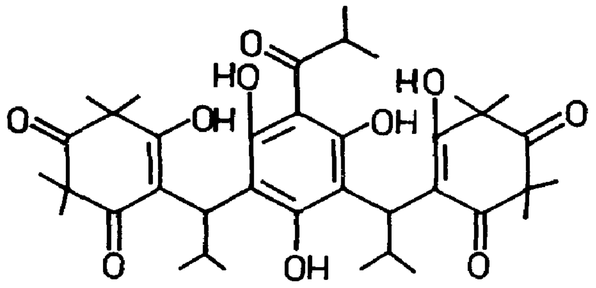
MYRTUS (Myrtaceae)

M. communis L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 173).

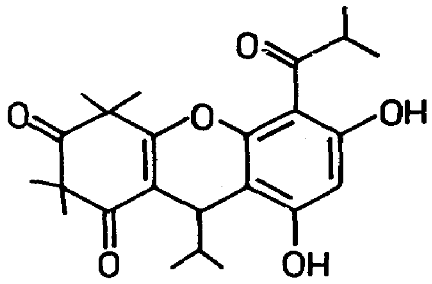
Macro - and microscopic studies on fruits and seeds (*J. Res. Indian Med.* 1973, *8*, 66).

Isolation and structure elucidation of two acylphloroglucinols - myrtucommulones A and B (*Tetrahedron* 1974, *30*, 991); limonene (23.4), linalool (20.2), α-pinene (14.5), cineole (11.6), p-cymol (1.8), camphene (0.5), β-pinene (0.3%) and traces of car-3-ene found in leaf essential oil (*Khim. Prir. Soedin.* 1978, *14*, 529; *Chem. Abstr.* 1978, *89*, 176379 g); estimation of tannin content (19.05%) in leaves (*Doga* 1978, *2*, 75; *Chem. Abstr.* 1979, *90*, 19036 w).

NEW COMPOUNDS



Myrtucommulone A



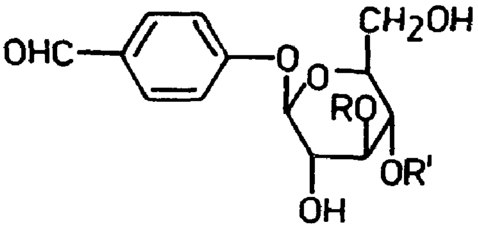
Myrtucommulone B

NANDINA (Nandinaceae)

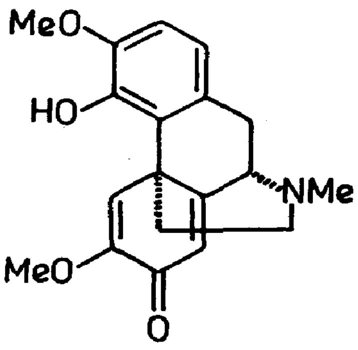
N. domestica Thunb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 285).

Isocorydine isolated from fruits (*Yakugaku Zasshi* 1972, *92*, 207; *Chem. Abstr.* 1972, *76*, 124117 g); two new glycosides - nantenoside A and nantenoside B - isolated from leaves along with amentoflavone (*Chem. Pharm. Bull.* 1974, *22*, 2750); nandazurine isolated from bark assigned zwitterion structure, sinoacutine also isolated (*Yakugaku Zasshi* 1974, *94*, 97; *Chem. Abstr.* 1974, *80*, 108725 f); a new base - dehydronantenine - isolated from bark; (-)episyringaresinol also isolated (*Yakugaku Zasshi* 1975, *95*, 445; *Chem. Abstr.* 1975, *83*, 25083 f; *Shoyakugaku Zasshi* 1979, *33*, 84; *Chem. Abstr.* 1979, *91*, 207404 j); a new base - 4,5-dioxodehydronantenine - isolated from fruits along with 1,2- dimethoxy-9,10-methylenedioxy-7-oxodibenzo[de-g]quinoline, N-nornantenine, O-methyldomesticine, protopine and isocorydine (*Shoyakugaku Zasshi* 1979, *33*, 84; *Chem. Abstr.* 1979, *91*, 207404 j).

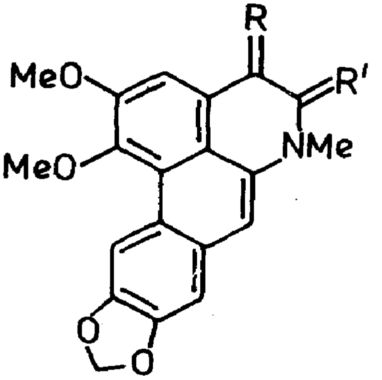
NEW COMPOUNDS



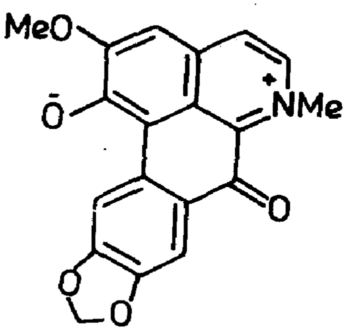
Nantenoside A
R,R' = H/Cinnamoyl
Nantenoside B
R,R' = H/Caffeoyl



Sinoacutine



Dehydronantenine
R,R' = H
4,5-Dioxodehydronantenine
R,R' = O



Nandazurine

NARCISSUS (Amaryllidaceae)

N. tazetta L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, p. 286).

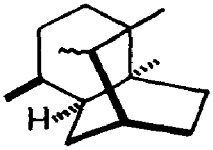
Isorhamnetin and tazettin isolated from flowers (*Khim. Prir. Soedin.* 1970, *6*, 475; *Chem. Abstr.* 1971, *74*, 10348 m); α-pinene (0.08), β-pinene (0.02), car-3-ene (0.02), sabinene (0.2), limonene (0.15), γ-terpinene (0.16), cineole (3.0), p-cymol (0.17), terpinolene (0.15), α-terpineol (0.95), linalool (16.02), nerol (0.74), geraniol (1.25), cinnamyl alcohol (5.78), methyl anthranilate (15.1) and benzyl acetate (12.25%) identified in absolute oil from flowers (*Khim. Prir. Soedin.* 1972, *8*, 405; *Chem. Abstr.* 1972, *77*, 149677 y); narcissin, mp. 174°, isolated (*Farm. Zh.* 1972, *27*, 86; *Chem. Abstr.* 1972, *77*, 111492 w); α-amyrin, β-sitosterol, stearic acid, linoleic acid, linolenic acid and lycorine isolated (*Egypt. J. Pharm. Sci.* 1976, *17*, 273; *Chem. Abstr.* 1979, *90*, 92317 t).

NARDOSTACHYS (Valerianaceae)

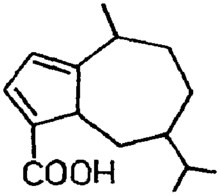
N. jatamansi DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 286).

Revised structure of nardostachone (*Tetrahedron Lett.* 1970, 413); structure of jatamansic acid (*Arch. Pharm.* 1974, *307*, 791; *Chem. Abstr.* 1975, *82*, 4423 f); seychellene and seychelane isolated; seychelane found to be mixture of two epimers (*Indian J. Chem.* 1974, *12*, 1221; *Phytochemistry* 1976, *15*, 224); norseychelanone, patchouli alcohol and α- and β-patchoulenes isolated from roots (*Phytochemistry* 1976, *15*, 224); actinidine isolated from rhizomes (*Shoyakugaku Zasshi* 1978, *32*, 121, *Chem. Abstr.* 1979, *90*, 51471 v).

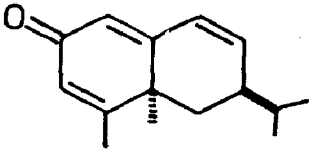
NEW COMPOUNDS



Seychelane



Jatamansic acid



Nardostachone

NARINGI (Rutaceae)

N. alata (Wall. ex Wt. & Arn.) Ellis; syn. *Limonia alata* Wall. ex Wt. & Arn., *Pleiospermium alatum* (Wall. ex Wt. & Arn.) Swingle

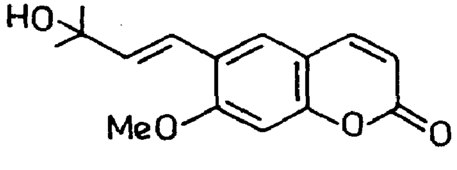
Alatamide [(E)N-(p-methoxystyryl)-benzamide] and N-benzoyltyramine isolated from leaves (*Aust. J. Chem.* 1975, 28, 457).

Distribution : Nilgiri and Annamalai Hills and eastwards in Tamil Nadu.

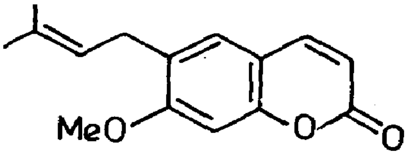
N. crenulata (Roxb.) Nicolson syn. *Limonia crenulata* Roxb., *L. acidissima* auct. (non L.), *Hesperethusa crenulata* (Roxb.) M. Roem. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 287).

4-Methoxy-1-methyl-2-quinolone from bark (*Phytochemistry* 1971,*10*, 2843); in addition, sitosterol, marmesin, suberosin, suberenol and 7-methoxy-6-(2,3-epoxy-3-methylbutyl)coumarin isolated from root bark (*Phytochemistry* 1972, *11*, 3331).

NEW COMPOUNDS



Suberenol



Suberosin

NASTURTIUM (Brassicaceae)

N. fontanum Aschers.; see *Roripa nasturtium-aquaticum* (L.) Hayek

N. officinale R. Br.; see *Roripa nasturtium-aquaticum* (L.) Hayek

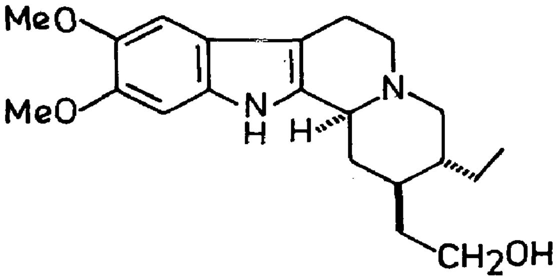
NEISOSPERMA (Apocynaceae)

N. oppositifolium (Lamk.) Fosb. & Sach. syn. *Ochrosia borbonica* sensu Hook.f. (non J.F. Gmel.), *O. oppositifolia* (Lamk.) K. Schum.

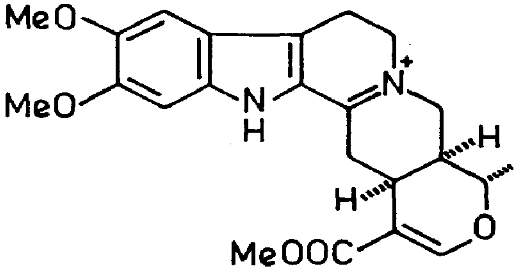
Eight alkaloids isolated from bark, two of these characterised as ochropposine and ochropposinine (*Phytochemistry* 1972, *11*, 2109; *Ann. Pharm. Fr.* 1972, *30*, 821; *Chem. Abstr.* 1973, *78*, 145210 p); in addition, reserpiline, isoreserpiline, reserpinine, isoreserpinine, 10-methoxydihydrocorynantheol and ochrolifuanine isolated from bark (*Ann. Pharm. Fr.* 1972, *30*, 821; *Chem. Abstr.* 1973, *78*, 145210 p); two new alkaloids - 10-hydroxyapparicine and 10-methoxyapparicine - isolated along with isoreserpiline and their structures determined (*Tetrahedron Lett.* 1978, 4173).

Distribution : Tidal forests of Andaman Islands.

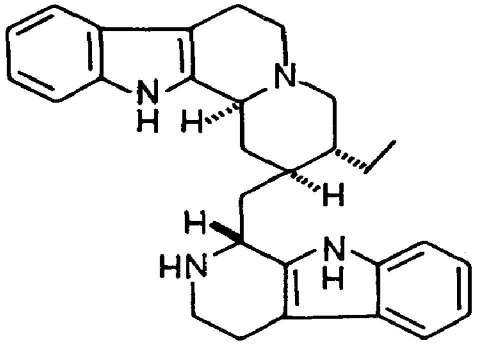
NEW COMPOUNDS



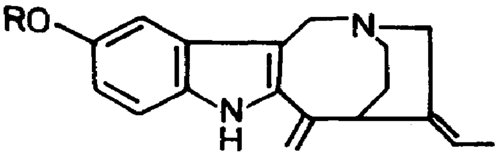
Ochropposinine



Ochropposine



Ochrolifuanine



10-Hydroxyapparicine
R = H
10-Methoxyapparicine
R = Me

NELUMBIUM (Nymphaeaceae)

N. speciosum Willd.; see *Nelumbo nucifera* Gaertn.

NELUMBO (Nymphaeaceae)

N. nucifera Gaertn. syn. *Nelumbium speciosum* Willd. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 288).

Anonaine, pronuciferine, nuciferine, N-nornuciferine, O-nornuciferine, liriodenine, d-methylcoclaurine, remerine and dl-armepavine isolated (*Yakugaku Zasshi* 1970, *90*, 1165; *Chem. Abstr.* 1971, *74*, 1110 a; *J. Chinese Chem. Soc.* 1972, *19*, 143; *Chem. Abstr.* 1972, *77*, 161937 r); methylcorypalline, neferine, isoliensinine and lotusine isolated from embryo (*J. Chinese Chem. Soc.* 1970, *17*, 235; *Chem. Abstr.* 1971, *74*, 100254 g; *J. Chinese Chem. Soc.* 1970, *17*, 54; *Chem. Abstr.* 1970, *73*, 99072 s); structure of nornuciferine (*Yakugaku Zasshi* 1971, *91*, 896; *Chem. Abstr.* 1971, *75*, 129975 z); seeds contained β-sitosterol, palmitic acid and glucose (*Curr. Sci.* 1972, *41*, 59); oxoushinsunine and N-norarmepavine isolated from seeds (*J. Chinese Chem. Soc.* 1972, *19*, 143; *Chem. Abstr.* 1972, *77*, 161937 r).

BIOLOGICAL ACTIVITY

Oxoushinsunine showed tumour inhibitory activity against nasopharynx carcinoma (*J. Chinese Chem. Soc.* 1972, *19*, 143; *Chem. Abstr.* 1972, *77*, 161937 r).

NEOLITSEA (Lauraceae)

N. cassia (L.) Kostermans syn. *Litsea zeylanica* Nees (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 290).

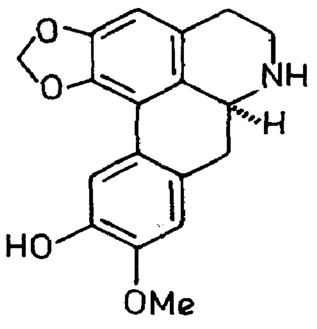
Co-occurrence of (+)reticuline, (+)isoboldine and (+)N-norisoboldine in plant indicative of their biogenetic relationship (*Indian J. Chem.* 1971, *9*, 770).

N. chinensis (Lam.) Chun syn. *Litsea chinensis* Lam.,

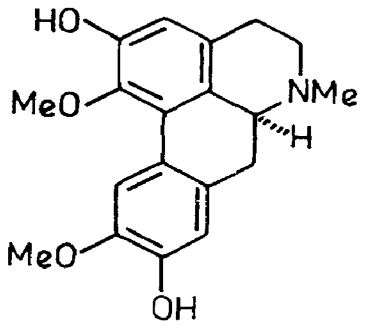
L. glutinosa (Lour.) C.B. Robins, *L. sebifera* Pers. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 155).

Laurotetanine, actinodaphnine, their N-methyl derivatives, boldine and norboldine isolated (*Phytochemistry* 1972, *11*, 1149, 3507); a new flavonoid - naringerin - characterised as naringenin-7-monorhamnoside isolated from leaves along with naringin, kaempferol-3- and 7-glucosides, quercetin and its 3-rhamnoside, pelargonidin-3- and 5-glucosides (*Nat. Appl. Sci. Bull.* 1975, *27*, 95; *Chem. Abstr.* 1977, *86*, 185952 d; *Indian J. Chem.* 1978, *16*B, 244); two new alkaloids - sebiferine and litseferine - isolated from trunk bark (*Indian J. Chem.* 1976, *14*B, 150); detection of cystine, glycine, L-alanine, β-alanine, valine, tyrosine, proline, phenylalanine and leucine in leaves by PC (*Nat. Appl. Sci. Bull.* 1976, *28*, 209; *Chem. Abstr.* 1979, *91*, 154297 t); biosynthesis of boldine (*J. Chem. Soc.* Perkin 1 1977, 706).

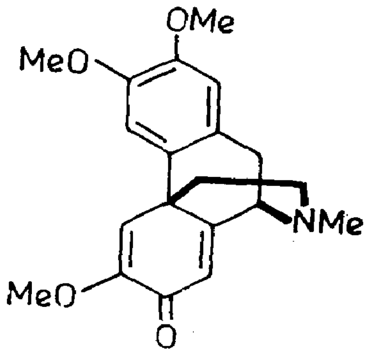
NEW COMPOUNDS



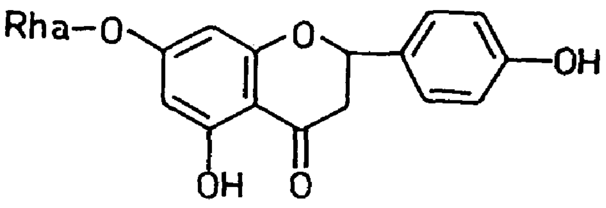
Litseferine



Boldine



Sebiferine



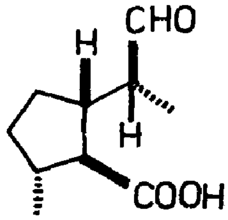
Naringerin

NEPETA (Lamiaceae)

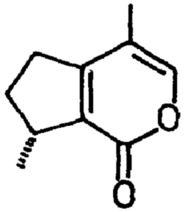
N. cataria L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 291).

A new monoterpene - 5,9-dehydronepetalactone - isolated (*Phytochemistry* 1972, *11*, 453); cis-nepetalactone isolated (*Int. Congr. Essent. Oils* 1974, *149*, 11; *Chem. Abstr.* 1976, *84*, 135829 g); mono- and diglycerides present in neutral lipids of seeds (*Khim. Prir. Soedin.* 1978, *14*, 174; *Chem. Abstr.* 1978, *89*, 39439 n); nepetalactone (40.0) and nepetalic acid (43.0%) isolated (*Lloydia* 1978, *41*, 367).

NEW COMPOUNDS



Nepetalic acid



5,9-Dehydronepetalactone

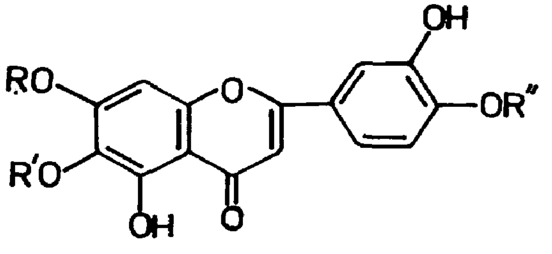
BIOLOGICAL ACTIVITY

LD50 values of nepetalic acid and nepetalactone in mice were 1050 and 1550 mg/kg respectively. Nepetalic acid (62.5 mg/kg) increased hexobarbital sleeping time in mice. Nepetalic acid (125-250 mg/kg) or nepetalactone (500-700 mg/kg) decreased performance of rats trained on Sideman avoidance schedule (*Lloydia* 1978, *41*, 367).

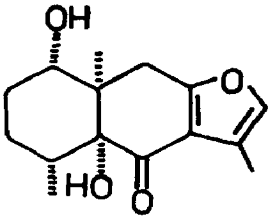
N. hindostana (Roth) Haines syn. *N. ruderalis* Buch.-Ham. ex Benth. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 291).

Stigmasterol, β-sitosterol, dinatin, nepetin, 6-hydroxyluteolin and a new flavone - 7,4′-O-dimethylscutellarein - isolated (*Indian J. Chem.* 1973, *11*, 338); structure of nepetin confirmed by synthesis (*Indian J. Chem.* 1974, *12*, 914); isolation and structure elucidation of nehipetol and nehipediol (*Rocz. Chem.* 1976, *50*, 1931; *Chem. Abstr.* 1977, *86*, 140271 q).

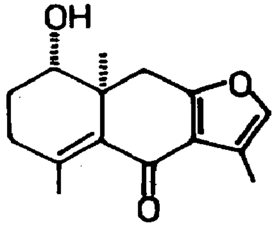
NEW COMPOUNDS



Nepetin
R,R'' = H, R' = Me
7,4'-O-Dimethylscutellarein
R,R'' = Me, R' = H



Nehipediol



Nehipetol

N. ruderalis Buch.-Ham. ex Benth.; see *N. hindostana* (Roth) Haines

NEPHELIUM (Sapindaceae)

N. litchi Camb.; see *Litchi chinensis* (Gaertn.) Sonner

N. longana (Lamk.) Camb.; see *Euphorbia longan* (Lour.) Steud.

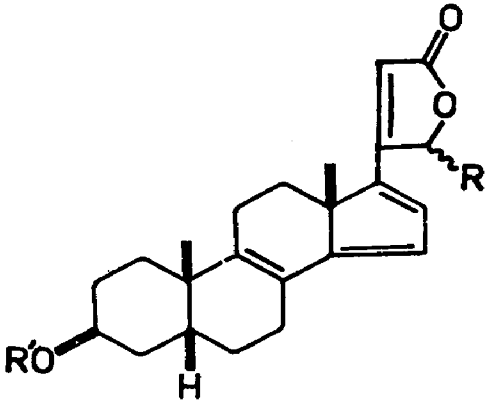
NERIUM (Apocynaceae)

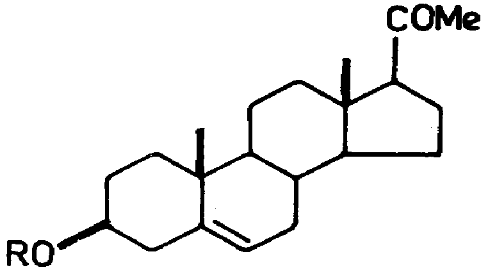
N. indicum Mill. syn. *N. odorum* Soland. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 292).

Dambonitol obtained from leaves and stems (*Nagoya Shiritsu Daigaku Yakugakubu Kenkyu Nenpo* 1970, 79; *Chem. Abstr.* 1971, *75*, 126445 f; (*Phytochemistry* 1971, *10*, 896); 2,4-dihydroxyacetophenone and 4-hydroxyacetophenone isolated from root bark (*Phytochemistry* 1972, *11*, 1852); oleandrigenin-β-D-glucopyranosyl-β-D-diginopyranoside isolated from leaves (Jpn. 7,406,113 (1972) May, 8; *Chem. Abstr.* 1974, *80*, 124754 v); pregnenolone, mono-, di- and triglucosides (I,II,III and IV) isolated from trunk bark and characterised (*Phytochemistry* 1972, *11*, 3345); plumericin found in plant (*Indian J. Chem.* 1973, *11*, 297); 16-dehydroadynerigenin-β-D-diginoside and 16-dehydroadynerigenin-β-D-digitaloside isolated from leaves (*Phytochemistry* 1973, *12*, 2737); oleandrin isolated (Ger. 2,248,457 (1973) April, 12; *Chem. Abstr.* 1973, *78*, 164077 s) neridienone A isolated from root bark characterised as 12β-hydroxypregna-4,6,16-trien-3,20-dione (*Chem. Pharm. Bull.* 1974, *22*, 1680; *Phytochemistry* 1976, *15*, 1745); odoroside A, kaempferol-3-glucoside and a mixture of ursolic and oleanolic acids, β-sitosterol and its glucoside isolated from flowers (*Taiwan Ke Hsueh* 1975, *29*, 47; *Chem. Abstr.* 1976, *84*, 118469 x); α-amyrin, β-sitosterol, kaempferol and odoroside B isolated from root bark (*Indian J. Pharm.* 1975, *27*, 126); uzarigenin-β-D-digitaloside and its β-D-glucosyl(1→4)-β-D-digitaloside isolated from root bark along with odoroside B; oleandrigenin-β-gentiobiosyl(1→4)-β-D-digitaloside(16-O-acetylneogitostin) also isolated (*Phytochemistry* 1976, *15*, 1275); cardenolide pigments - neriumosides A-1,A-2,B-1, B-2 and C-1 - isolated from roots and their structures determined (*Tetrahedron Lett.*

1976, 1115); neridienone A, neridienone B, 12β-hydroxypregna-4,6-dien-3,20-dione (V), 12 β-hydroxypregn-4-en-3,20-dione (VI) and 12β-hydroxy-16α-methoxypregna-4,6-dien-3,20-dione (VII) isolated from root bark (*Phytochemistry* 1976, *15*, 1745); an unsaturated lactone glycoside of plumericin, mp. 224°, isolated (*India* 138,350 (1976) Jan. 24; *Chem. Abstr.* 1979, *91*, 181443 u); digitoxigenin-α-L-oleandroside and 5α-adynerin isolated from leaves and characterised (*Chem. Pharm. Bull.* 1978, *26*, 3023); neriaside isolated and its structure established (*Tetrahedron Lett.* 1978, 1825).

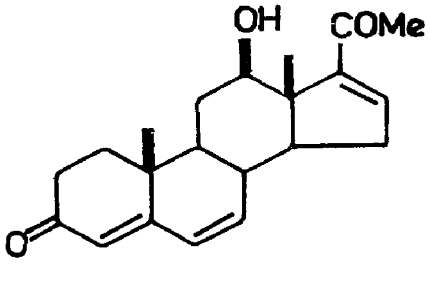
NEW COMPOUNDS



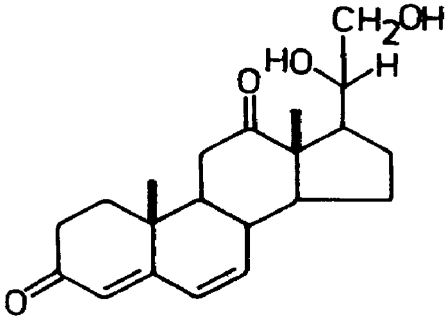


Neriumoside A-1
R = OH, R' = Digitalose(4→1)gentiobiose
Neriumoside A-2
R = OH, R' = Digitalose(4→1)Glu
Neriumoside B-1
R = H, R' = Digitalose(4→1)gentiobiose
Neriumoside B-2
R = H, R' = Digitalose(4→1)Glu
Neriumoside C-1
R = H, R' = Diginose(4→1)gentiobiose

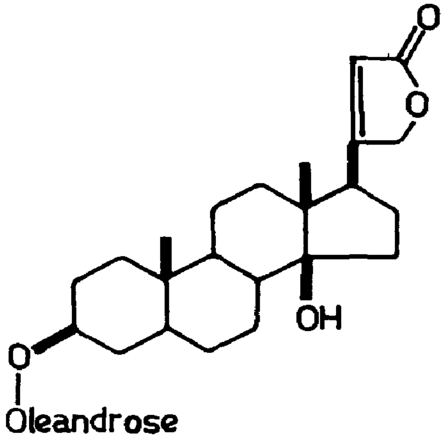
I
R = Glu
II
R = Glu(6→1)Glu
III
R = Glu(2→1)Glu
IV
R = Glu[X](6→1)Glu
X = (2→1) Glu



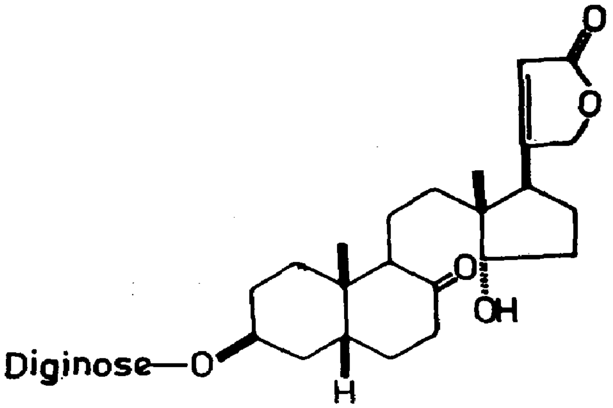
Neridienone A



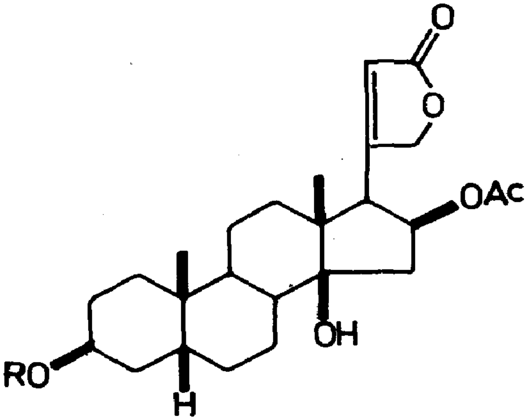
Neridienone B



Digitoxigenin-α-L-oleandroside

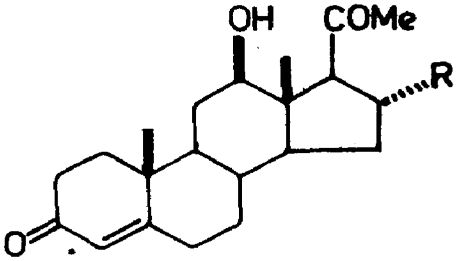


Neriaside



Oleandrigenin-β-D-glucopyranosyl-β-D-diginopyranoside

R = Diginose(4→1)Glu



V

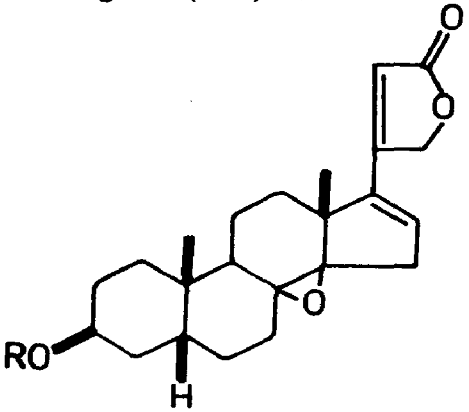
R = H; Δ6

VI

R = H

VII

R = OMe; Δ6



16-Dehydroadynerigenin-β-D-diginoside

R = Diginose

16-Dehydroadynerigenin-β-D-digitaloside

H = Digitalose

BIOLOGICAL ACTIVITY

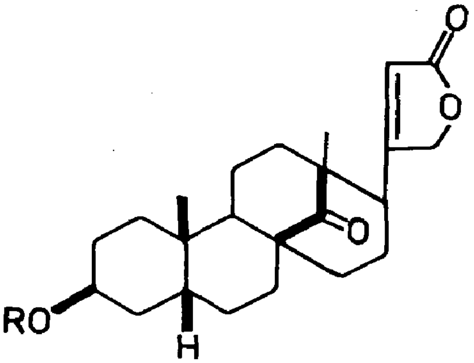
Oleandrin and oleandrigenin-β-D-glucopyranosyl-β-D-diginopyranoside showed cardiokinetic and diuretic activities (Jpn. 7,406,113 (1972) May, 8; *Chem. Abstr.* 1974, *80*, 124754 v; Ger. 2,248,457 (1973), Apr. 12; *Chem. Abstr.* 1973, *78*, 164077 s).

N. odorum Soland.; see *N. indicum* Mill.

N. oleander L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 292).

Oleandrin and adynerin isolated from Egyptian plant (*Egypt. J. Pharm. Sci.* 1973, *14*, 113; *Chem. Abstr.* 1974, *80*, 118251 n); neritaloside, urechitoxin, adynerin, β-sitosterol, ursolic and oleanolic acids isolated from leaves (*Egypt. J. Chem.* 1973, *16*, 75; *Chem. Abstr.* 1974, *80*, 80094 y); neriaside and oleosides A,B,C,D,E and F isolated from leaves; structures of aglycone (oleagenin) and oleosides determined (*Tennen Yuki Kogobutsu Torankai Koen Yoshishu* 1978, 592; *Chem. Abstr.* 1979, *90*, 138139 s; *Chem. Pharm. Bull.* 1979, *27*, 1604).

NEW COMPOUNDS



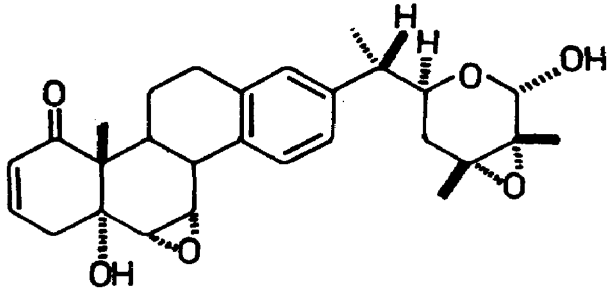
Oleoside A
R = Diginose
Oleoside B
R = Digitalose
Oleoside C
R = Glu(4→1)diginose
Oleoside D
R = Glu(4→1)digitalose
Oleoside E
R = Gentiobiosyl(4→1)diginose
Oleoside F
Gentiobiosyl(4→1)digitalose

NICANDRA (Solanaceae)

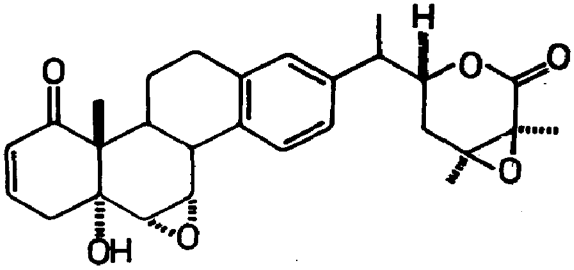
N. physaloides (L.) Gaertn. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 176).

Two steroids - Nic-3 and Nic-7 - isolated and their structures determined; crystal structure of Nic-7 (*Chem. Commun.* 1972, 1108); isolation and structure of Nic-1 (nicandrenone), Nic-10, Nic-12 and Nic-17; crystal structure of Nic-10 (*Chem. Commun.* 1972, 1250; *J. Chem.* Soc. Perkin 1 1976, 304); β-sitosterol isolated from fruits (*Acta Phytother.* 1972, *19*, 121; *Chem. Abstr.* 1972, *77*, 149696 d); withanicandrin isolated from leaves and characterised as 6α,7α-epoxy-5α-hydroxy-1,12-dioxo-22(R)- witha-2,24-dienolide (*J. Chem. Soc.* Perkin 1 1972, 2109); structure of nicandrenone established (*Indian J. Pharm.* 1973, *35*, 123; *Pharmazie* 1976, *31*, 647; *Chem. Abstr.* 1976, *85*, 189219 x); isolation and structure elucidation of Nic-2 (*Chem. Commun.* 1974, 125); isolation and structure of Nic-1 lactone (*Phytochemistry* 1976, *15*, 1317).

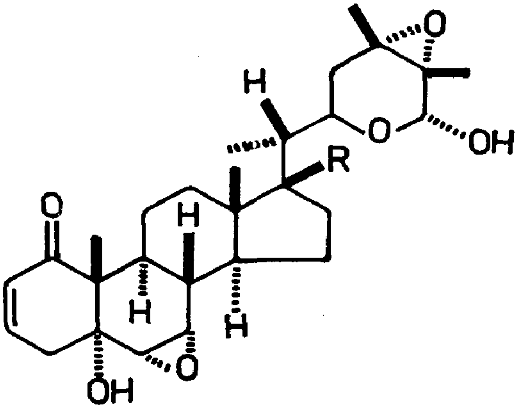
NEW COMPOUNDS



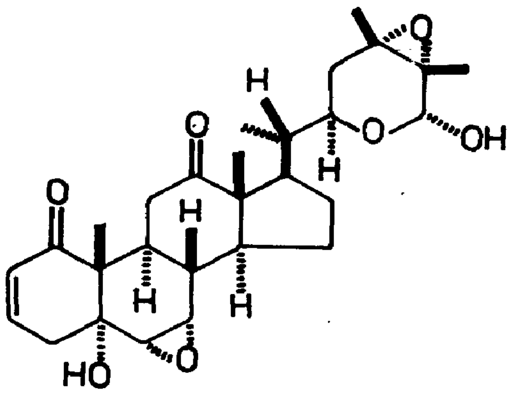
Nic-1



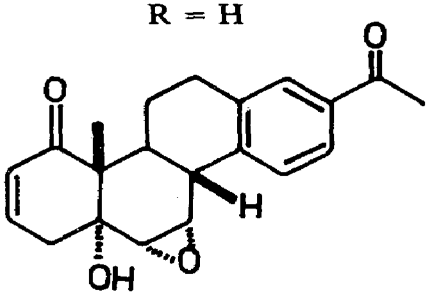
Nic-1 lactone



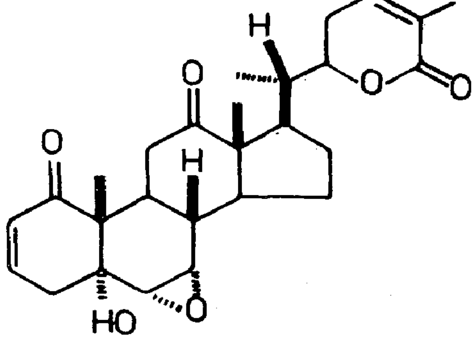
Nic-2
R = OH
Nic-3
R = H



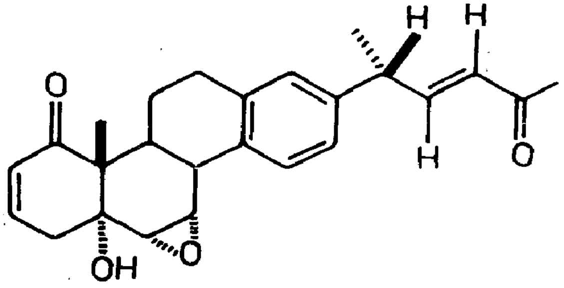
Nic-7



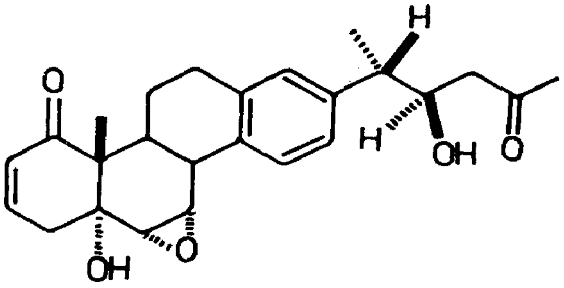
Nic-10



Withanicandrin



Nic-12



Nic-17

NICOTIANA (Solanaceae)

N. plumbaginifolia Viv.

H.- Jangli tambakhu

Solaplumbine, mp. 180°, isolated from aerial parts (*Phytochemistry* 1974, *13*, 2020).

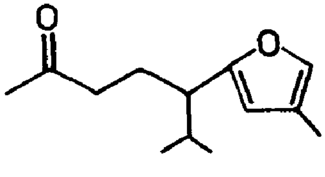
Distribution : Native of Mexico and West Indies; naturalised in India. Found as weed in many parts of country in plains.

N. tabacum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 293).

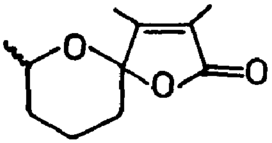
1'-Hexanoylnornicotine and 1-octanoylnornicotine isolated (*Phytochemistry* 1972, *11*, 2341); three new pyridine alkaloids - 5-methyl-2,3'-bipyridine, N-formylnornicotine and N-acetylnornicotine - isolated (*Phytochemistry* 1972, *11*, 3371); solanofuran and spiroxabovolide isolated and characterised (*Helv. Chim. Acta* 1973, *56*, 265); D-alanyl-D-alanine isolated from leaves (*Agric. Biol. Chem.* 1973, *37*, 2439; *Chem. Abstr.* 1974, *80*, 105838 j); three new volatile terpenic constituents - 3,4E-epoxy-5ξ-isopropyl-2-methylheptan-2-ol (I), its diastereoisomer and 3,4E-epoxy-5ξ-isopropylheptan-2-one (II) isolated and characterised (*Acta Chem. Scand.* 1973, *27*, 2232); isolation and structure of cis and trans(±)2-methyl-5-(2-methyl-5-isopropenyltetrahydro-2-furyl)-furans (III,IV) and their dihydro derivatives (V,VI) (*Acta Chem. Scand.* 1974, *28*B, 538); driman-8-ol and driman-8,11-diol isolated and their structures determined (*Acta Chem. Scand.* 1974, *28*B, 289); caffeoyl putrescine, caffeoyl spermidine and dicaffeoyl spermidine identified (*Ann. Tab.* 1974, 123; *Chem. Abstr.* 1976, *84*, 147656 m); a new keto alcohol - R(-)3-hydroxy-β-ionone - isolated (*Agric. Biol. Chem.* 1974,*38*,891; *Chem. Abstr.* 1974, *81*, 23178 a); isolation and characterisation of new tobacco flavour constituents - (1-methyl-4-isopropyl-7,8-dioxabicyclo[3.2.1]octan-6-yl) methyl ketone (VII), 1-(1-methyl-4-isopropyl-7,8-dioxabicyclo[3.2.1]octan-6-yl) ethanol (VIII), 2-(1-methyl-4-isopropyl-7,8-dioxabicyclol[3.2.1]octan-6-yl)propane-2-ol(IX), 3,3,5-trimethyl-8-isopropyl-4,9-dioxabicyclo[3.3.1]nonan-2-ol (X), 5-isopropyl-6,7-epoxy-8-hydroxy-8-methylnonan-2-one (XI), 3,4-epoxy-5-isopropylnonan-2,8-dione (XII) and trans-5-isopropyl-8-hydroxy-8-methylnon-6-en-2-one (XIII) (*Helv. Chim. Acta* 1974, *57*, 192); synthesis of a new constituent - 14,15-bisnor-8-hydroxylabd-11E-en-13-one (XIV) - from volatile oil of leaves (*Acta Chem. Scand.* 1974, *28*B, 131); bombiprenone isolated and characterised as

6,10,14,18,22,26,30,34-octamethyl-5,9,13,17,21,25,29,33-pentatriacontaoctaen-2-one (*Phytochemistry* 1976, *11*, 467); presence of cycloartanol (4.0), cycloartenol (87.0), 24-methylenecycloartanol (5.0%), lanost-8-en-3β-ol (tr), β-amyrin (tr), daturaolone and daturadiol in seeds (*Phytochemistry* 1977, *16*, 1723); solavetivone isolated and its structure assigned (*Phytochemistry* 1977, *16*, 392); detection of cholesterol, cholest-7-enol, 24-methylenecholesterol, campesterol, stigmasterol, sitosterol, 28-isofucosterol, lanosterol, 31-norlanosterol, lanost-8-enol, obtusifoliol, 31-norcycloartenol, cycloeucalenol, gramisterol, citrostadienol, β-amyrin, lupeol,cycloartanol and 24-methylenecycloartanol in seed oil by GLC and TLC (*Hanguk Nonghwa Hakhoe Chi* 1978, *21*, 51; *Chem. Abstr.* 1979, *90*, 100109 u); dry leaves contained paraffinic hydrocarbons (0.17%), hentriacontane being major component; of total paraffins, odd numbered n-paraffins constituted 91.0% while the major even numbered component, dotriacontane, was 7.6% (*Tob. Res.* 1978, *3*, 18; *Chem. Abstr.* 1979, *90*, 19259 w); crystal structure of solanascone (*Chem. Commun.* 1978, 563); saccharopine (N-(2-glutaryl)-L-lysine) isolated from leaves (*Phytochemistry* 1978, *17*, 991); six sphingolipids comprising two groups, N-acetylglucosamine [glucuronic acid, inositol phosphate] ceramide (PSL-I) and glucosamine [glucuronic acid, inositol phosphate] ceramide (PSL-II); sugar component in lipids consisted of arabinose and galactose differing in molar ratios (*Biochemistry* 1978, *17*, 3569; *Chem. Abstr.* 1978, *89*, 143392 c); determination of nonvolatile organic and fatty acids by GLC (*J. Chromatogr. Sci.* 1978, *16*, 314; *Chem. Abstr.* 1978, *89*, 126313 k); 31-norlanost-9(11)-enol (tr), 24-methyl-31-norlanost-9(11)-enol (tr), 4,24-dimethylcholesta-7,24-dienol (tr), 4-methyl-24-ethyl- cholesta-7,24-dienol (1.0), 31-norcycloartanol (tr) 31- norcycloartenol (2.0), cycloeucalenol (6.0), 31-norlanost-8-enol (1.0), 31-norcycloartenol (2.0), cycloeucalenol (6.0), 31-norlanost-8-enol (1.0), 31-norlanosterol (4.0), obtusifoliol (1.0), 4,14,24-trimethylcholesta-8,24-dienol (tr), 4-methylcholesta-8-enol (1.0), lophenol (14.0), 24-methyllophenol (1.0), 24-ethyllophenol (1.0), gramisterol (5.0) and citrostadienol (60.0%) estimated in seed oil (*Phytochemistry* 1978, 17, 971); megastigma-5,8-dien-4-one isolated (*Helv. Chim. Acta* 1979, *62*, 67); dehydrololiolide, mp. 59° and 3-oxoactinidol isolated from leaves (*Agric. Biol. Chem.* 1979, *43*, 1149; *Chem. Abstr.* 1979, *91*, 52982 v); two new alkaloids - N'-formylanabasine and N'-formylanatabine - isolated (*Agric. Biol. Chem.* 1979, *43*, 1607; *Chem. Abstr.* 1979, *91*, 154268 j); 1-(1'-2'S-nornicotino)-1-deoxy-β-D-fructofuranose (XV) isolated from leaves (*Agric. Biol. Chem.* 1979, *43*, 1421; *Chem. Abstr.* 1979, *91*, 120562 k).

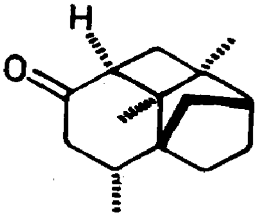
NEW COMPOUNDS



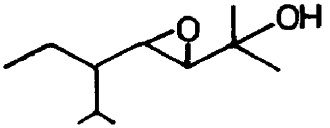
Solanofuran



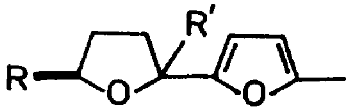
Spiroxabovolide



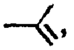
Solanascone



I



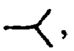
III

R = , R′ = α-Me

IV

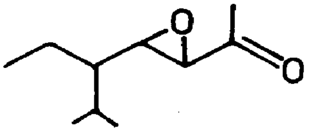
R = , R′ = β-Me

V

R = , R′ = α-Me

VI

R = , R′ = β-Me



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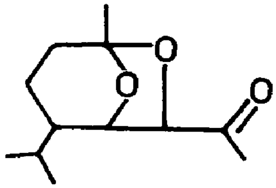
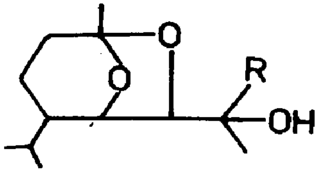


VII

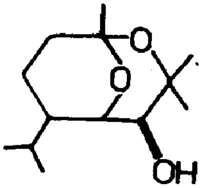


VIII

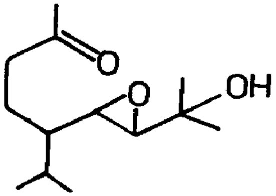
R = H

IX

R = Me



X



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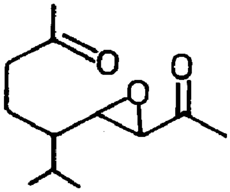

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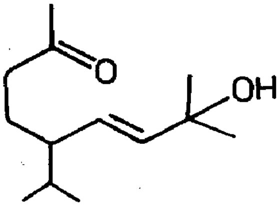

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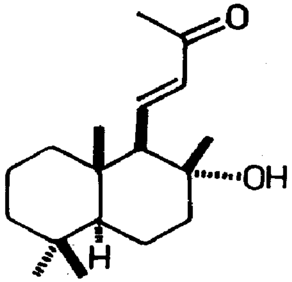
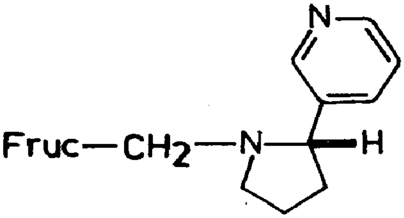
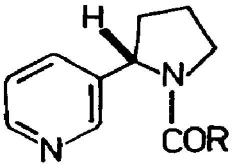


XIV



XV



N-Formylnornicotine

R = H

N-Acetylnornicotine

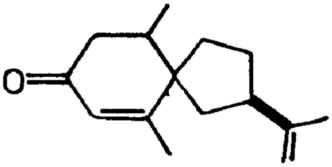
R = Me

1′-Hexanoylnornicotine

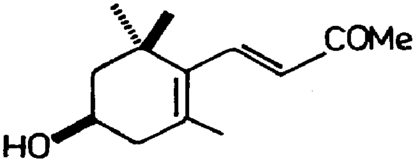
R = n-C_5H_{11}

1′-Octanoylnornicotine

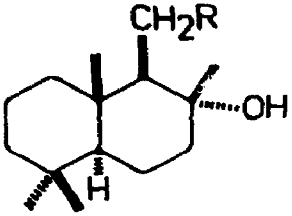
R = n-C_7H_{15}



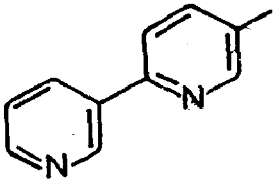
Solavetivone



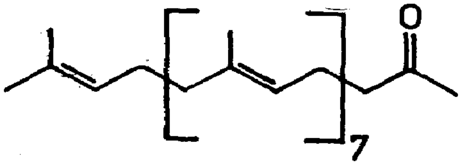
R (-)3-Hydroxy-β-ionone



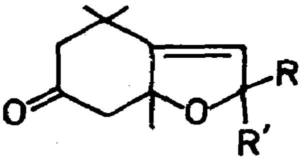
Driman-8-ol
R = H
Driman-8,11-diol
R = OH



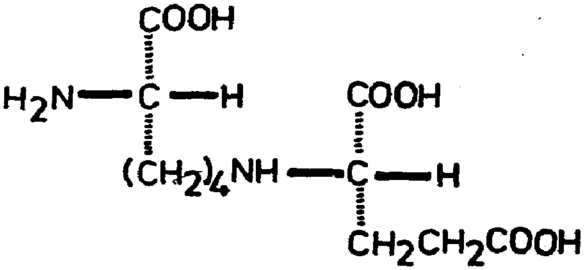
5-Me-2,3′-bipyridine



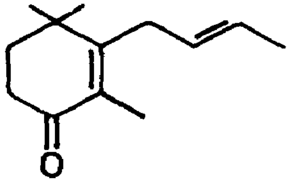
Bombiprenone



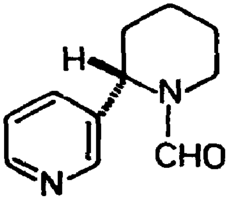
Dehydroloiolide
RR′ = O
3-Oxoactinidol
R = H, R′ = CHMeOH



Saccharopine



Megastigma-5,8-dien-4-one



N-Formylanabasine

BIOLOGICAL ACTIVITY

Nicotinic acid (40 mg/kg,i.v.) when administered to dog, caused drop in caffeine-induced free fatty acid levels within 30 minutes which persisted for four hours (*J. Pharmacol. Exp. Ther.* 1970, *175*, 348). Inhibitory effect of nicotine on gastric antral and duodenal contractile activity in dogs was shown to be due to release of catecholamines (*J. Pharmacol. Exp. Ther.* 1970, *172*, 377); nicotine (100 μg/kg in one minute) when administered i.v. in healthy anaesthetised dog, produced significant increases in heart rate, mean aortic pressure, left ventricular work, myocardial oxygen consumption, total coronary blood flow and effective capillary flow to heart muscle immediately after injection (*J. Pharmacol. Exp. Ther.* 1970, *173*, 138); administration of nicotine (25 to 100 μg,i.v.) inhibited gastric antral and duodenal muscle contractile activity in unanaesthetised dog; magnitude and duration being proportional to dosage (*J. Pharmacol. Exp. Ther.* 1970, *172*, 367); nicotine at 37.5 μg/kg, i.p., showed self-stimulation in rats; at higher dose levels intensity of effects varied to some extent (*J. Pharmacol. Exp. Ther.* 1971, *176*, 229); i.v. administration of nicotine was found to protect anaesthetised dogs against death produced by infusion of KCl (*J. Pharmacol. Exp. Ther.* 1972, *181*, 147); nicotine influenced force of

contraction in depolarised cat ventricular muscle by releasing sarcolemmal membrane-bound calcium (*J. Pharmacol. Exp. Ther.* 1973, *185*, 457); administration of nicotine in vertebral artery or lateral ventricle in cat produced hypotensive effect accompanied by bradycardia and respiratory stimulation (*Indian J. Pharmacol.* 1974, *6*, 186); nicotine blocked contractile effect of muscarine on isolated rabbit ileum and shifted muscarine dose-response curve to right without affecting the maximum response (*Indian J. Physiol. Pharmacol.* 1974, *18*, 57); nicotine at low concentration (1-5 μg/ml) abolished or greatly reduced poststimulus response on rebound excitation of guinea pig small intestine; both contractile force and duration of response were reduced. This depressant action was reversed by increasing concentration of nicotine to 100 μg/ml (*J. Pharmacol. Exp. Ther.* 1976, *196*, 71); nicotine (1 mg) injected in anaesthetised pig, produced sino-auricular block and arterioventricular block and brief decrease in blood pressure and bradycardia. In nonanaesthetised pigs blood pressure decrease was long-lasting (*Basic Res. Cardiol.* 1976, *71*, 371; *Chem. Abstr.* 1977, *86*, 83615 d); nicotine significantly increased sexual receptivity in estrogen-treated female rats (*Pharmacol. Biochem. Behav.* 1977, *7*, 147; *Chem. Abstr.* 1978, *88*, 15920 r); infusion of nicotine at low concentration (0.05 mM) caused an immediate, progressively increasing and lasting stimulation of insulin secretion by isolated perfused rat pancreas; at high concentration (1mM) triphasic effect (brief decrease, stimulation peak and prolonged decrease) on insulin secretion was seen (*C. R. Seances Soc. Biol. Ses. Fil.* 1978, *172*, 156; *Chem. Abstr.* 1978, *89*, 84632 f).

NIGELLA (Ranunculaceae)

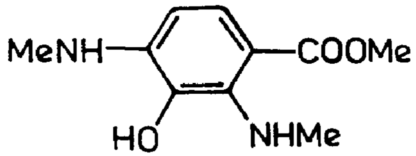
N. damascena L.

Eng.- Love in a mist.

Damascenine and damascinine, mp. 75°, isolated from seeds (*Pharmazie* 1970, *25*, 69; *Chem. Abstr.* 1970, *73*, 42377 r); (+)β-elemene and (-)α-selinene isolated from seeds (*Planta Med.* 1976, *30*, 59).

Distribution. Grown in Indian gardens.

NEW COMPOUNDS



Damascinine

N. sativa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 294).

Ether extract when injected into lactating rats on a balanced diet showed more powerful galactagogue action than estrogen (0.05 μg/100 gms) (*Indian J. Med. Sci.* 1971, *25*, 535).

Cholesterol, campesterol, stigmasterol, β-sitosterol and α-spinasterol isolated from seed oil (*Planta Med.* 1973, *24*, 375).

NOTHAPODYTES (Icacinaceae)

N. nimmoniana (Graham) Mabberley syn. *Mappia foetida* (Wt.) Miers, *M. oblonga* Miers, *M. oblonga* Miers var. *elliptica* Miers, *M. ovata* Miers, *M. tomentosa* Miers

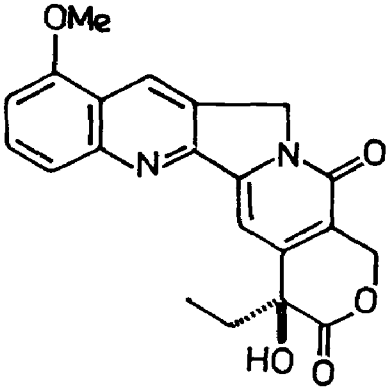
Mar.- Kalgur Ghanera; Tam.- Arali, Chorla; Kan.- Kodsa, Hedare.

Aqueous extract showed anticancer activity (*Indian J. Chem.* 1975, *13*, 758).

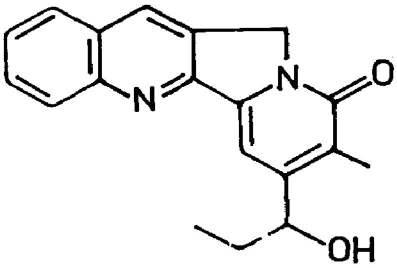
Camptothecin and 9-methoxycamptothecin isolated (*Indian J. Chem.* 1972, *10*, 453; *Phytochemistry* 1972, *11*, 3529; *Indian J. Chem.* 1973, *11*, 969); 21-methylenecycloartanol, α- and β- amyrins, β-sitosterol and 3β-hydroxymanoyloxide isolated (*Indian J. Chem.* 1973, *11*, 969); isolation of mappicine and its structure elucidation (*J. Chem. Soc.* Perkin 1 1974, 1215); trigonelline isolated (*Indian J. Chem.* 1975, *13*, 758).

Distribution : Western Peninsula, mostly in hills ascending to 2100 m.

NEW COMPOUNDS



9-Methoxycamptothecin



Mappicine

NOTONIA (Asteraceae)

N. grandiflora DC. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 177).

Kaempferol-7-rhamnoside, kaempferol-3,7-dirhamnoside, lupeol, β-sitosterol and succinic acid isolated from leaves (*Planta Med.* 1972, *22*, 205; *Indian J. Pharm.* 1976, *38*, 130); kaempferitrin isolated from flowers; lupenone and friedelin isolated from leaves (*Indian J. Pharm.* 1976, *38*, 130).

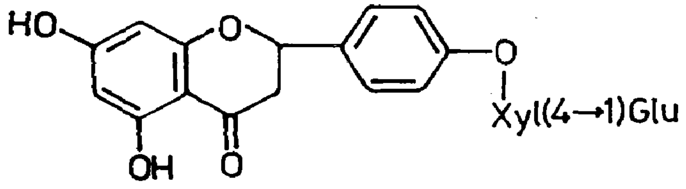
NYCTANTHES (Oleaceae)

N. arbor-tristis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 294).

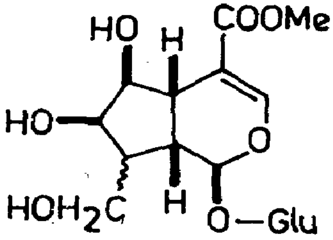
A new iridoid - nyctanthoside - isolated and characterised (*Tetrahedron Lett.* 1975, 2423); crocin-1 (β-digentiobioside ester of α-crocetin), and crocin-3 (β-monogentiobioside ester of α-crocetin) isolated from flowers (*Indian J. Chem.* 1976, *14*B, 231); D-mannitol isolated from flowers; detection of astragalin and nicotiflorin by chromatography (*Vijnana Parishad*

Anusandhan Patrika 1976, *19*, 377; *Chem. Abstr.* 1977, *87*, 18988 j); a new glycoside naringenin-4′-O-β-D-glucopyranosyl-α-xylopyranoside - isolated from stem along with β-sitosterol (*J. Indian Chem. Soc.* 1978, *55*, 1049).

NEW COMPOUNDS



Naringenin-4′-O-β-glucopyranosyl-α-xylopyranoside



Nyctanthoside

NYMPHAEA (Nymphaeaceae)

N. alba L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 295)

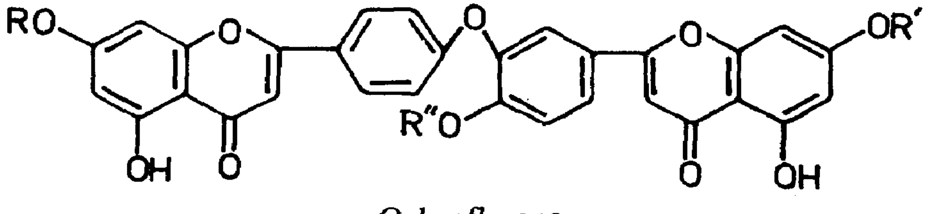
Luteolin-8-C-β-D-glucopyranoside isolated from leaves (*Khim. Prir. Soedin.* 1970, *6*, 629: *Chem. Abstr.* 1971, *74*, 39164 j); β-sitosterol and gallic acid isolated (*Indian J. Chem.* 1974, *12*, 226).

OCHNA (Ochnaceae)

O. obtusa DC. var. *obtusa* syn. *O. squarrosa* auct. (non L.), *O. squarrosa* var. *cordata* (Thw.) Bennett (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 178).

Ochnaflavone and two related biflavones I and II isolated from leaves and their structures determined (*Tetrahedron Lett.* 1973, 2003).

NEW COMPOUNDS



Ochnaflavone
R,R′,R″ = H
Biflavone I
R,R′ = H, R″ = Me
Biflavone II
R,R′ = Me,H/H,Me, R″ = Me

O. squarrosa L.; see *O. obtusa* DC. var. *obtusa*

O. sqarrosa var. *cordata* (Thw.) Bennett; see *O. obtusa* DC. var. *obtusa*

OCHROCARPUS (Clusiaceae)

O. longifolius Benth. & Hook.f.; see *Mammea suriga* (Ham. ex Roxb.) Kosterm.

OCHROSIA (Apocynaceae)

O. borbonica Hook.f.; see *Neisosperma oppositifolium* (Lamk.) Fosb. & Sach.

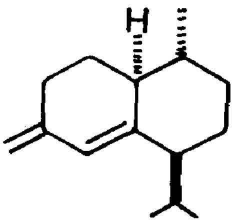
O. oppositifolia (Lamk.) K. Schum.; see *Neisosperma oppositifolium* (Lamk.) Fosb. & Sach

OCIMUM (Lamiaceae)

O. basilicum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 295).

New sesquiterpene hydrocarbon - 1-epibicyclosesquiphellandrene - isolated from oil (*Phytochemistry* 1974, *13*, 1183); methyl chavicol (90%) and linalool present in essential oil obtained from green leaves (*Tap. Chi Hoa Hoc* 1977, *15*, 29; *Chem. Abstr.* 1978, *88*, 158268 v).

NEW COMPOUNDS



Epibicyclosesquiphellandrene

O. canum Sims. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 179).

Polysaccharide contained xylose, arabinose, rhamnose and galactose (9.7:6:7.7:1); galacturonic acid and glucuronic acid detected by PC (*Curr. Sci.* 1978, *47*, 582).

O. kilimandscharicum Guerke (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1956, p. 296).

Camphor (0.04), β-sitosterol (0.02), oleanolic acid (0.86) and ursolic acid (0.18%) obtained from inflorescence (*J. Indian Chem. Soc.* 1973, *50*, 69).

O. sanctum L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 179).

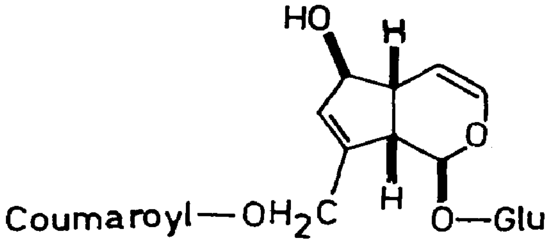
Eugenol (70.5), its methyl ether (4.8), nerol (6.4), caryophyllene (7.5), terpinen-4-ol (0.4), decylaldehyde (0.2), γ-selinene (0.4), β-pinene (0.4), camphene (2.0) and α-pinene (3.5%) identified in essential oil by GC (*Parfuem. Kosmet.* 1978, *59*, 230; *Chem. Abstr.* 1978, *89*, 94878 e).

ODONTITES (Scrophulariaceae)

O. serotina (Lamk.) Dum. syn. *Bartsia odontites* Hook.f. (non Huds.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 296).

A new iridoid - odontoside - isolated and characterised as 5-p-coumaroylaucubin (*Khim. Prir. Soedin.* 1970, *6*, 474; *Chem. Abstr.* 1971, *74*, 1048 m).

NEW COMPOUNDS



Odontoside

OENANTHE (Apiaceae)

O. javanica (Bl.) DC. syn. *O. stolonifera* (Roxb.) Wall. ex DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 296).

Palmitic acid, aspartic acid, stigmasterol, glucosamine and galactosamine isolated from roots and aerial parts (*Yakugaku Zasshi* 1972, *92*, 1295; *Chem. Abstr.* 1973, *78*, 26436 g); L-valine, L-alanine, L-isoleucine, l-eicosanol, 1-docosanol, 1-tetracosanol and sitosterol isolated from aerial parts (*Yakugaku Zasshi* 1974, *94*, 412; *Chem. Abstr.* 1974, *81*, 132749 h; *Indian J. Chem.* 1976, *14*, 475); detection of carvacrol and eugenol by GCMS; isorhamnetin, camphene and β-pinene isolated (*Yakugaku Zasshi* 1977, *97*, 698; *Chem. Abstr.* 1977, *87*, 114553 j).

O. stolonifera (Roxb.) Wall. ex DC.; see *O. javanica* (Bl.) DC.

OLDENLANDIA (Rubiaceae)

O. affinis (R. & S.) DC.; see *Hedyotis affinis* R. & S.

O. dichotoma (Koen. ex Roth) Hook.f.; see *Hedyotis affinis* R. & S.

O. diffusa (Willd.) Roxb.; see *Hedyotis diffusa* Willd.

O. umbellata K. Schum.; see *Hedyotis auriculata* L.

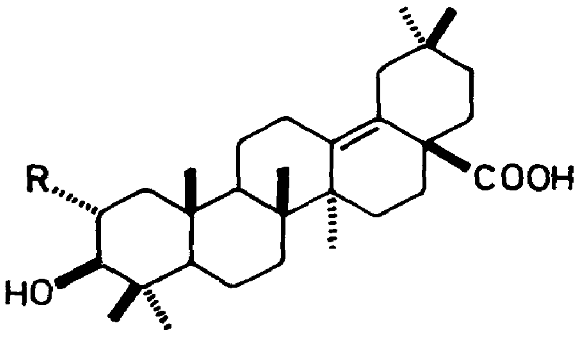
OLEA (Oleaceae)

O. europaea L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 297).

Cinchonidine isolated from leaves (*Naturwiss.* 1971, *58*, 524; *Chem. Abstr.* 1972, *76*, 43987 p); oleanolic acid isolated from husks and leaves (*Phytochemistry* 1974, *13*, 1551, 2825);

in addition, maslinic acid and oleanane acids I and II isolated from leaves (*Phytochemistry* 1974, *13*, 2825); apigenin and its 7-di-O-D-xyloside isolated from leaves (*Khim. Prir. Soedin.* 1974, *10*, 97; *Chem. Abstr.* 1974, *81*, 60813 z).

NEW COMPOUNDS



Oleanane acid I
R = OH
Oleanane acid II
R = H

OLEANDRA (Oleandraceae)

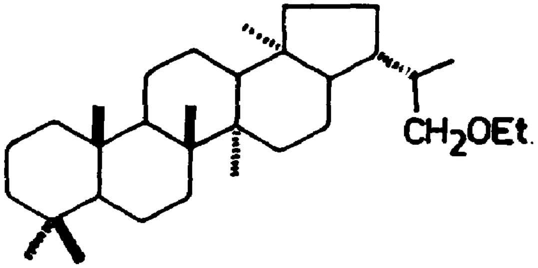
O. neriiformis Bedd. (neriifolia); see *O. pistillaris* (Sw.) C. Chr.

O. pistillaris (Sw.) C. Chr. syn *O. neriiformis* sensu Bedd. Ferns Brit. India, t. 264, 1868.

4-Desmethyl sterols - campesterol (11.0), stigmasterol (4.0) and sitosterol (85.0%); 4-methyl sterols - cycloeucalenol (30.0), citrostadienol (10.0), 24-methylenelophenol and an unknown sterol (58.0%); dimethyl sterols - cycloartenol (41.0) and 24-methylenecycloartanol (59.0%) - isolated from Malaysian plant (*Phytochemistry* 1972, *11*, 2882); 29-ethoxyhopane isolated from rhizomes and characterised (*Tetrahedron Lett.* 1979, 287).

Distribution : Eastern Himalayas, Nepal and Bhutan.

NEW COMPOUNDS



29-Ethoxyhopane

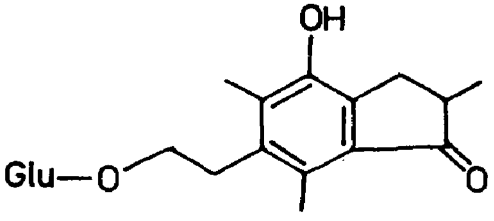
ONYCHIUM (Cryptogrammaceae)

O. japonicum (Thunb.) Kunze

Isolation and structure determination of a new indanone glucoside - pteroside M (*Phytochemistry* 1974, *13*, 509).

Distribution : Himalayas and Meghalaya, alt. 900-1800 m.

NEW COMPOUNDS



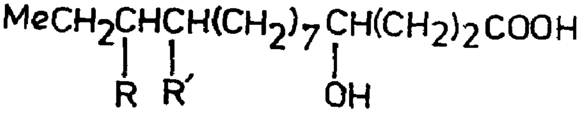
Pteroside M

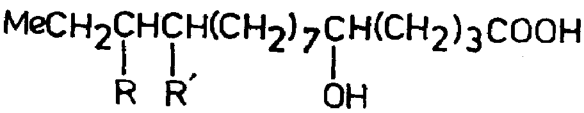
OPERCULINA (Convolvulaceae)

O. turpethum (L.) Silva Manso syn. *Ipomoea turpethum* (L.) R. Br. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 181).

Scopoletin isolated; glucose, rhamnose and fructose obtained by acid and alkaline hydrolysis of resin (*Indian J. Pharm.* 1972, *34*, 126); turpethinic acids A,B,C,D and E isolated from resin; all of them contained same sugar moiety identified as O-β-D-glucopyranosyl(1→3)-O-α-L-rhamnopyranosyl(1→3)-O-β-D-glucopyranosyl(1→3)-O-β-D-glucopyranoside; aglycone of turpethinic acid A identified as 3,12-dihydroxypentadecanoic acid, B as 4,12-dihydroxypentadecanoic acid, C as 3,12-dihydroxyhexadecanoic acid, D as 4,12-dihydroxyhexadecanoic acid and E as 11-hydroxyhexadecanoic acid (*Planta Med.* 1978, *33*, 144).

NEW COMPOUNDS

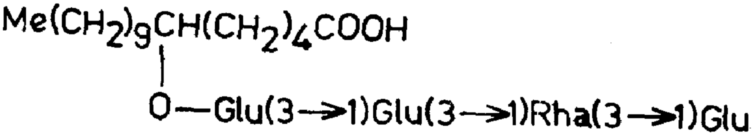




Turpethinic acid A
R = O-X, R′ = H
Turpethinic acid B
R = H, R′ = O-X

Turpethinic acid C
R = O-X, R′ = H
Turpethinic acid D
R = H, R′ = O-X

X = Glu(3→1)Glu(3→1)Rha(3→1)Glu



Turpethinic acid E

OPHELIA (Gentianaceae)

O. angustifolia D. Don.; see *Swertia angustifolia* Buch.-Ham. ex D. Don

O. chirata Griseb.; see *Swertia chirayita* (Roxb. ex Flem.) Kars.

OPHIORRHIZA (Rubiaceae)

O. mungos L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, p. 181).

Camptothecin and 10-methoxycamptothecin isolated from leaves (*Lloydia* 1976, *39*, 261).

BIOLOGICAL ACTIVITY

10-Methoxycamptothecin at a concentration of 10 and 20 mg/ml of nutrient agar overlay showed 89 and 100% inhibition respectively of herpes virus plaques (*Lloydia* 1976, *39*, 261).

OPUNTIA (Cactaceae)

O. dillenii (Ker-Gawl.) Haw.; see *O. elatior* Mill.

O. elatior Mill. syn. *O. dillenii* auct. pl. [non(Ker-Gawl.)Haw.] (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 299).

A polysaccharide containing galactose and arabinose in 3:1 molar ratio isolated from pods (*Planta Med.* 1974, *25*, 92).

ORIGANUM (Lamiaceae)

O. majorana L.; see *Majorana hortensis* Moench

O. vulgare L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 299).

Kaempferol isolated (*Farmacia* 1972, *20*, 561; *Chem. Abstr.* 1973, *78*, 121349 q); 1,8-cineole, limonene, terpineol and thymol identified in essential oil by TLC and spectrometrically (*Clujul Med.* 1978, *51*, 168; *Chem. Abstr.* 1978, *89*, 220744 y).

OROBANCHE (Orobanchaceae)

O. aegyptiaca Pers. syn. *O. indica* Buch.-Ham. ex Roxb. (non Spreng.), *O. ramosa* auct.(non L.) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 182).

Atropine (75.7) and hyoscine (18.5%) found by TLC in Egyptian plant along with belladonnine, apoatropine and meteloidine as minor alkaloids (*Bull. Fac. Pharm. Cairo Univ.* 1976, *14*, 231; *Chem. Abstr.* 1977, *87*, 164210 r).

O. indica Buch.-Ham. ex Roxb.; see *O. aegyptiaca* Pers.

O. ramosa L.; see *O. aegyptiaca* Pers.

OROPETIUM (Poaceae)

O. thomaeum (L.f.) Trin.

Cyanidin-3-glucoside isolated from leaves (*Phytochemistry* 1972, *11*, 858).

Distribution : Punjab to Bengal and southwards to western peninsula, in plains.

OROXYLUM (OROXYLON) (Bignoniaceae)

O. indicum (L.) Vent. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 299).

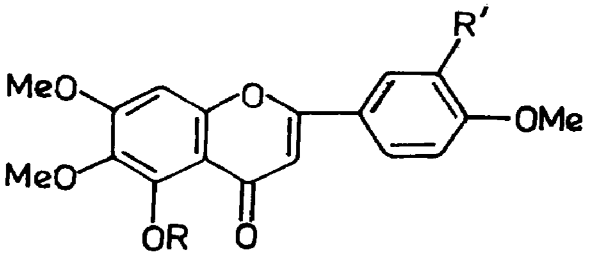
Baicalein, its 6-glucuronide and 7-glucuronide, mp. 220°, scutellarein, its 7-glucuronide, mp. 205°, isolated from leaves and stem bark (*Phytochemistry* 1972, *11*, 439; *Curr. Sci.* 1972, *41*, 62); in addition, oroxylin A, chrysin and scutellarein-7-rutinoside isolated from stem bark (*Curr. Sci.* 1972, *41*, 62); prunetin and β-sitosterol isolated from heartwood (*Planta Med.* 1977, *31*, 257).

ORTHOSIPHON (Lamiaceae)

O. aristatus (Blume) Miq. syn. *O. grandiflorus* Boldingh., *O. stamineus* Benth. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 182).

Two new flavones - 5-hydroxy-6,7,3',4'-tetramethoxyflavone (I) and 4',5,6,7-tetramethoxyflavone (II) - and isosinensetin isolated (*Fitoterapia* 1972, *43*, 35).

NEW COMPOUNDS



I

R = H, R' = OMe

II

R = Me, R' = H

O. grandiflorus Boldingh.; see *O. aristatus* (Blume) Miq.

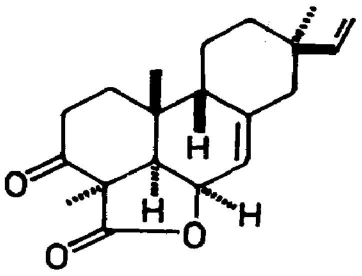
O. stamineus Benth.; see *O. aristatus* (Blume) Miq.

ORYZA (Poaceae)

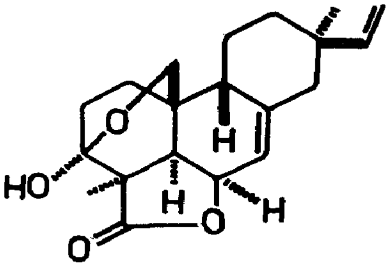
O. sativa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 299).

Structures of two diterpene lactone growth inhibitors - momilactone A and momilactone B - confirmed by chemical transformations (*J. Chem. Soc.* Perkins 1 1977, 250).

NEW COMPOUNDS



Momilactone A



Momilactone B

OSMANTHUS (Oleaceae)

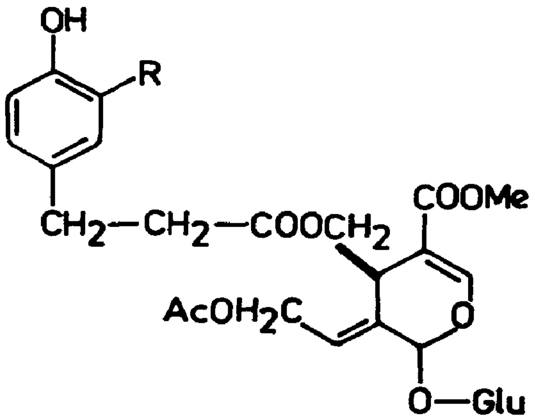
O. fragrans Lour.

H. - Shivlingi, Silangi; Lepcha - Tungrug.

Two new iridoid glycosides - 10-acetoxyligustroside and 10-acetoxyoleuropein - isolated along with acetoside and phillyrin (*Phytochemistry* 1975, *14*, 2029); 2-(4-hydroxyphenyl)ethanol, succinic acid, 1-O-β-D-glucosyl-2-(4-hydroxyphenyl)ethanol and a caffeic ester isolated from unripe fruits (*Kagoshima Daigaku Rigakubu Kiyo, Sugaku, Butsurigaku, Kagaku* 1977, *10*, 37; *Chem. Abstr.* 1978, *89*, 176360 u).

Distribution : Himalayas, from Garhwal to Sikkim and Khasi Hills, alt. 1000-2000 m.

NEW COMPOUNDS



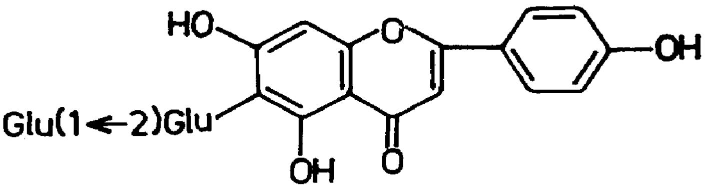
10-Acetoxyligustroside
R = H
10-Acetoxyoleuropein
R = OH

OXALIS (Oxalidaceae)

O. acetosella L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 183).

A new compound - 2′′-O-(β-D-glucopyranosyl)isovitexin - isolated from aerial parts (*Chem. Ber.* 1976, *109*, 2901).

NEW COMPOUNDS



2′′-Gluco-isovitexin

O. corniculata L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 184).

Alcoholic extract of leaves showed complete inhibition of growth of *Staphylococcus typhi, S. aureus, S. albus* and *S. citrus* at 6.5 mg/ml (*J. Res. Indian Med.* 1974, *9*, 80).

PACHYGONE (Menispermaceae)

P. ovata (Poir.) Hook.f. & Thoms. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 184).

Fruits are used as fish poison.

A new amine oxide - reticuline N-oxide - isolated from fruits along with N-methylcrotsparine, reticuline,liriodenine, trilobine, coclaurine and (+)quercitol (*J. Nat. Prod.* 1979, *42*, 399).

BIOLOGICAL ACTIVITY

Reticuline showed central stimulant and hyperthermic action in mice (*J. Nat. Prod.* 1979, *42*, 399).

PAEDERIA (Rubiaceae)

P. foetida L.; see *P. scandens* (Lour.) Merr.

P. scandens (Lour.) Merr. syn. *P. foetida* auct. (non L.), *P. tomentosa* Blume (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 300).

Plant extract showed anti-inflammatory activity stronger than that of acetylsalicyclic acid and weaker than that of hydrocortisone (*Indian J. Med. Sci.* 1973, *27*, 231).

Hentriacontane, hentriacontanol, methyl mercaptan, ceryl alcohol, palmitic acid, sitosterol, stigmasterol, campesterol, ursolic acid and iridoid glycosides - asperuloside, paederoside and scandoside - isolated from leaves and stems (*Phytochemistry* 1976, *15*, 1989).

P. tomentosa Blume; see *P. scandens* (Lour.) Merr.

PAEONIA (Ranunculaceae)

P. emodi Wall. ex Hook.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 300).

Starch (9.5), sucrose (5.4), malic acid (0.47), oxalic acid (0.36), tartaric acid (0.34%) and benzoic acid present in roots (*Pakistan J. Forest.* 1972, *22*, 109; *Chem. Abstr.* 1972, *77*, 149669 x).

PAJANELIA (Bignoniaceae)

P. longifolia (Willd.) K. Schum. syn. *P. rheedii* Wight, *P. multijuga* Kurz
Mar. - Doundi; Tam. - Aranthal; Kan. - Alangi; Mal. - Arlantha, Paiyani, Pajaneli; Khasi - Dieng-lang-leng; Andamans - Jhingan.

Baicalein, its 6-glucuronide and 7-glucuronide, scutellarein and its 7-glucuronide isolated from leaves (*Phytochemistry* 1972, *11*, 439); oroxylin A and chrysin isolated from bark (*Proc. Indian Acad. Sci.* 1977, *86*A, 41).

Distribution : Meghalaya, Western Ghats from Kanara to Travancore and Andaman Islands.

P. multijuga Kurz; see *P. longifolia* (Willd.) K. Schum.

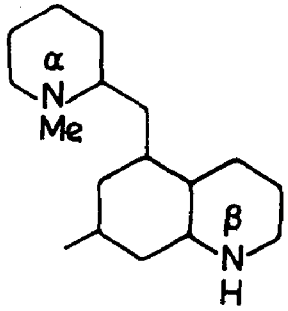
P. rheedii Wight; see *P. longifolia* (Willd.) K. Schum.

PALHINHAEA (Lycopodiaceae)

P. cernua (L.) Franco & Vasc. syn. *Lycopodium cernum* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 301).

Nα-Methylphlegmarine isolated (*Can. J. Chem.* 1978, *56*, 851).

NEW COMPOUNDS



Nα-Methylphlegmarine

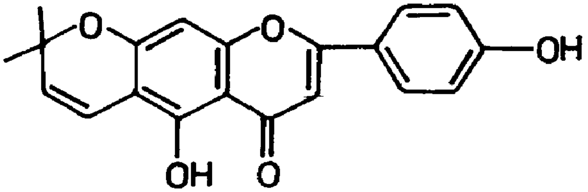
PAMBURUS (Rutaceae)

P. missionis (Wt.) Swingle syn. *Atlantia missionis* (Wt.) Oliver

A new flavone - 4′,5-dihydroxy-6′,6″-dimethylpyrano(2″,3″:7,6)-flavone (I) - daniellic acid and eperu-8(20)-en-15,19-dioic acid butenolide (II) isolated (*Phytochemistry* 1975, *14*, 1617).

Distribution : Western Peninsula.

NEW COMPOUNDS



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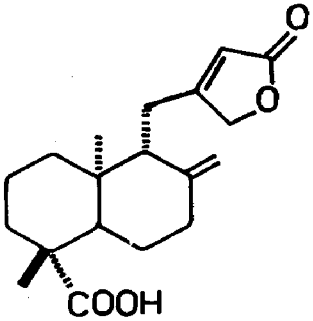
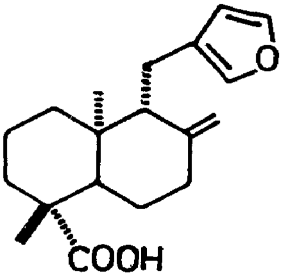


II



Daniellic acid

PANAX (Araliaceae)

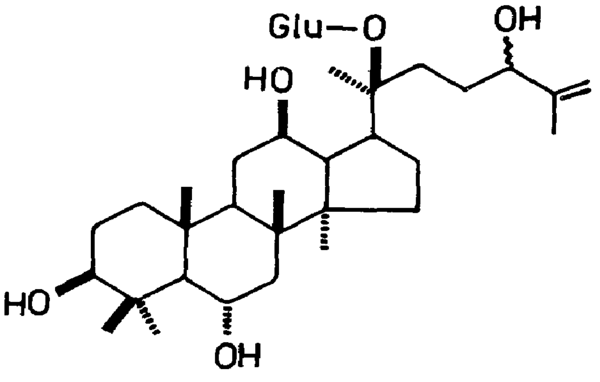
P. ginseng C.A. Mey syn. *Aralia quinquefolia* Decne. & Planch. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 301).

Ether extract of Korean ginseng roots was toxic to mice and inhibited sarcoma 180 and adenocarcinoma 755 roughly in proportion to weight loss of hosts; ethanol extract also significantly inhibited growth of sarcoma 180 (*Jap. J. Pharmacol.* 1971, *21*, 299); lipophilic fraction of extract and ginsenoside Rg_1 showed significant antifatigue effects in mice (*Jap. J. Pharmacol.* 1974, *24*, 119); crude saponin fraction at 10 mg/kg oral dose increased locomotor activity in normal and exhausted mice whereas ginsenoside Rg fraction (TRG) slightly decreased number of light beam interruptions, locomotor and rotating activities in PT test. Lipophilic fraction increased locomotor activity of exercised mice (*Jap. J. Pharmacol.* 1974, *24*, 41); root extract inhibited by 21% decrease of adrenal cholesterol in rats after three hours of swimming; it showed no effect on hepatic glycogen, but inhibited endogenous glycogen utilisation in white skeletal muscle during exercise (*Planta Med.* 1979, *36*, 43); neither lipophilic fraction nor ginsenoside Rg fraction of roots produced significant changes in acquisition of conditioned avoidance response. Lipophilic fraction (10 mg/kg) produced significant depression in acquisition of discrimination behaviour in rats (*Jap. J. Pharmacol.* 1979, *29*, 319).

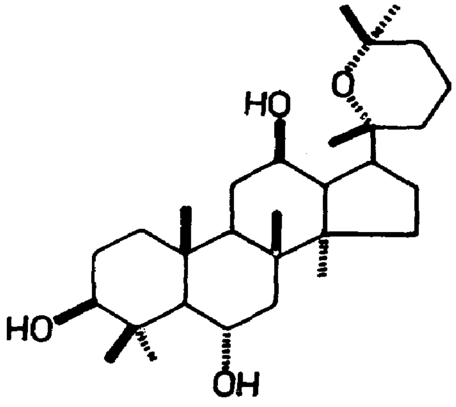
Panaxosides B′ and C isolated from roots found to be trisaccharides; carbohydrate moeity of former contained glucose units whereas that of latter contained glucose and rhamnose (2:1), two of these units were (1→2) linked (*Khim. Prir. Soedin.* 1970, *6*, 312; *Chem. Abstr.* 1970, *73*, 99157 y); panaxatriol isolated (*Chem. Pharm. Bull.* 1970, *18*, 2371); ginsenoside - Rg_1 isolated

from roots and its structure established (*Tetrahedron* 1971, *27*, 881; *Yamanouchi Seiyaku Kenkyu Hokoku* 1974, *3*, 22; *Chem. Abstr.* 1978, *88*, 117790 r; *Chih Wu Hsueh Pao* 1979, *21*, 181; *Chem. Abstr.* 1979, *91*, 120342 p); ginsenosides Rb_1, Rb_2 and Rc, mp. 197°, 200° and 199° respectively, on hydrolysis yielded 20(S)-protopanaxadiol; partial hydrolysis of these saponins yielded prosapogenin which was identified as 3-O-(2β-D-glucopyranosyl-β-D-gluco pyranosyl)(20S)-protopanaxadiol (*Chem. Pharm. Bull.* 1972, *20*, 1212); anti-inflammatory glycosides - panax saponins A and C - isolated, partial structure of former proposed (*Yakhak Hoe Chi* 1972, *16*, 129; *Chem. Abstr.* 1974, *80*, 116080 g); preparation of a cardiotonic substance which contains eight triterpenoid saponins (Jpn. 73,05,016 (1973) Feb. 13; *Chem. Abstr.* 1974, *80*, 19538 e); ginsenosides Ro, mp. 239° (= chikusetsusaponin V), Rb_1, Rb_2, Rc and Rd, mp. 206°, isolated from roots and their structures established (*Chem. Pharm. Bull.* 1974, *22*, 421; *Yamanouchi Seiyaku Kenkyu Hokoku* 1974, *3*, 22; *Chem. Abstr.* 1978, *88*, 117790 r; *Chih Wu Hsueh Pao*, 1979, *21*, 181; *Chem. Abstr.* 1979, *91*, 120342 p); ginsenosides Re, Rf isolated along with panaxadiol, panaxatriol, daucosterol, mannitol, sucrose and glucose (*Yamanouchi Seiyaku Kenkyu Hokoku* 1974, *3*, 22; *Chem. Abstr.* 1978, *88*, 117790 r; *Chih Wu Hsueh Pao* 1979, *21*, 181; *Chem. Abstr.* 1979, *91*, 120342 p); ginsenosides Rd, Re, Rg_1, isolated from flowers and buds (*Chem. Pharm. Bull.* 1976, *24*, 3212); new saponins - ginsenosides F_1, F_2 and F_3 - isolated from leaves and their structures established (*Chem. Pharm. Bull.* 1976, *24*, 2204); crude saponins isolated from aerial parts (leaves, 12.8, stems, 1.6 and flowers, 6.9%) (*Hanguk Nonghwa Hakhoe Chi* 1977, *20*, 142; *Chem. Abstr.* 1977, *87*, 114625 j); crystal structure of panaxoside A (*Tetrahedron Lett.* 1978, 593); new saponins - ginsenoside Rh_1 and M_7cd - isolated from roots and flower buds respectively and characterised as 6-O-β-D- gluco pyranoside of 20(S)-protopanaxatriol and 20-O-β-D-glucopyranoside of dammar-25-ene-3β,6α,12β,20(S),24ξ-pentaol respectively; ginsenosides Rb_1, Rb_2 and Rc isolated from leaves and flower buds; ginsenoside F_3 from flower buds; ginsenosides Rb_2, Rc, Rd, Re and Rg_1 isolated from fruits (*Chem. Pharm. Bull.* 1979, *27*, 88); in addition to above, ginsenosides Ra and Rg_2 isolated from roots (*Chih Wu Hsueh Pao*, 1979, *21*, 181; *Chem. Abstr.* 1979, *91*, 120342 p).

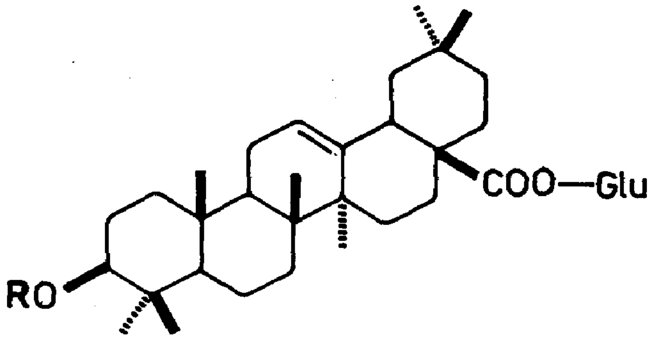
NEW COMPOUNDS



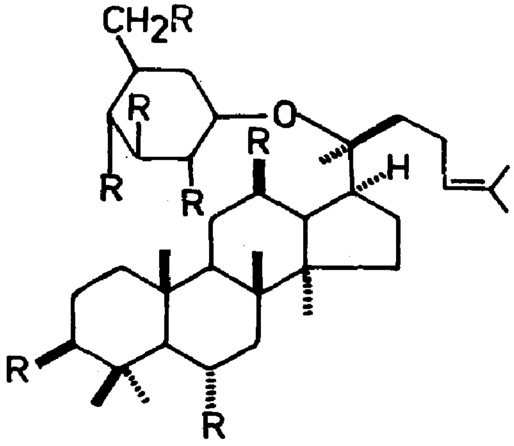
M_7cd



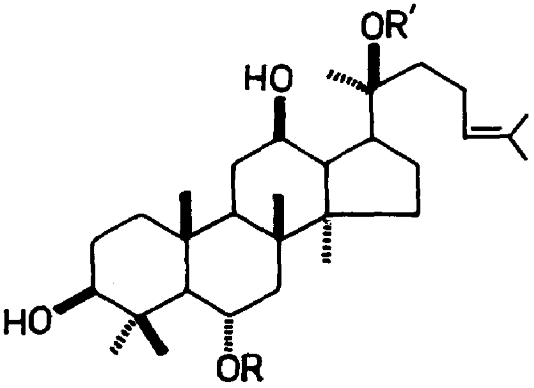
Panaxatriol



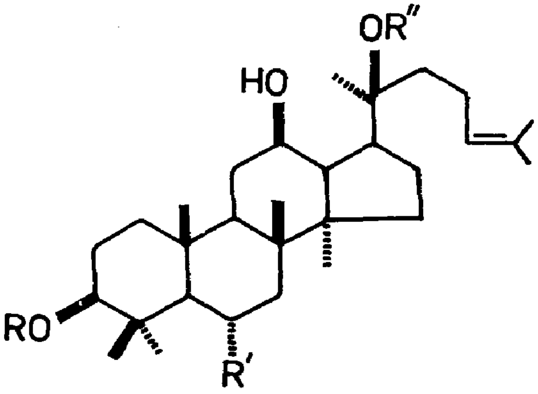
Ginsenoside Ro
R = Gluc. acid(2→1)Glu



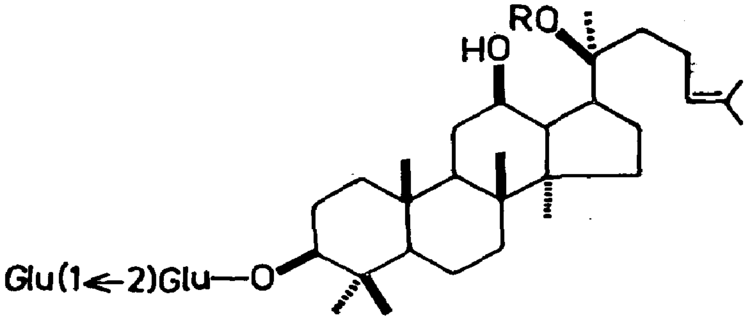
Panaxoside A
R = OAc



Ginsenoside Re
R = Glu(2→1)Rha, R′ = H
Ginsenoside Rf
R = Glu(2→1)Glu, R′ = H
Ginsenoside Rg_1
R, R′ = Glu
Ginsenoside Rh_1
R = Glu, R′ = H



Ginsenoside F_1
R = H, R′ = OH, R″ = Glu
Ginsenoside F_2
R = Glu, R′ = H, R″ = Glu
Ginsenoside F_3
R = H, R′ = OH,
R″ = Glu(6→1)Ara



Ginsenoside Rb1
R = Glu (6→1)Glu
Ginsenoside Rb2
R = Glu(6→1)Ara (pyranosyl)
Ginsenoside Rc
R = Glu(6→1)Ara (furanosyl)
Ginsenoside Rd
R = Glu

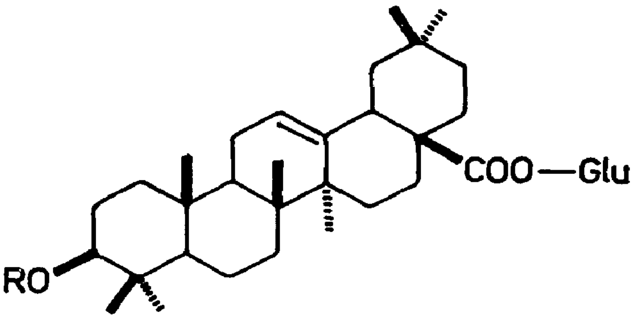
BIOLOGICAL ACTIVITY

A mixture of saponins containing mainly ginsenosides Rb and Rc showed central nervous system depressive, ataractic, analgesic, central myorelaxant and papaverine-like activities in mice, rats and guinea pigs (*Jap. J. Pharmacol.* 1972, *22*, 245); this mixture also prolonged hexobarbital sleeping time and decreased exploratory activity in mice and specifically blocked conditioned response in rats (*Jap. J. Pharmacol.* 1972, *22*, 339); panax saponins A and C showed anti-inflammatory activity in rats; the activity of the former was delayed and prolonged (*Yakhak Hoechi* 1972, *16*, 129; *Chem. Abstr.* 1974, *80*, 116080 g); saponins of leaves had neuroleptic, analgesic, hypertensive, cholinergic, histamine-like and papaverine-like activities (*Jap. J. Pharmacol.* 1973, *23*, 43); neutral saponins of root administered i.p. inhibited spontaneous and exploratory movement as well as conditioned response; potentiated nervous system depression; showed analgesic, anticonvulsant and antipyretic activities and appeared to have neuroleptic activity. Saponins did not cause loss of righting reflex, motor incoordination, myorelaxation, haemolysis or vasodilation (*Jap. J. Pharmacol.* 1973, *23*, 29); spontaneous behaviour of rats was suppressed by injection of saponin (10 mg/kg); 2.5 or 5.0 mg/kg doses increased open field exploratory behaviour and 5.0 mg/kg increased conditioned avoidance behaviour (*Soul Uidae Chapchi* 1973, *14*, 15; *Chem. Abstr.* 1973, *79*, 142887 z).

P. pseudoginseng Wall. syn. *Aralia pseudoginseng* (Wall.) Benth. ex Clarke, p.p. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 22).

Isolation of saponin A (Chikusetsusaponin V) and saponin D (ginsenoside Rb1) and their structure elucidation (*Chem. Pharm. Bull.* 1973, *21*, 2705); structures of saponin B (chikusetsusaponin IV) and saponin C (desarabinofuranosyl chikusetsusaponin IV) established (*Chem. Pharm. Bull.* 1975, *23*, 3282).

NEW COMPOUNDS



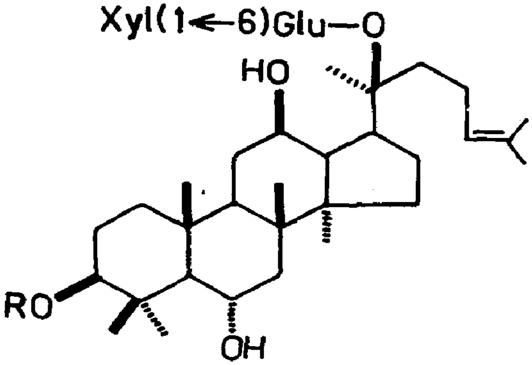
Chikusetsusaponin IV
R = Gluc.acid(4→1)Ara
Desarabinofuranosyl chikusetsusaponin IV
R = Gluc.acid

P. pseudoginseng Wall. ssp. *himalaicus* Hara

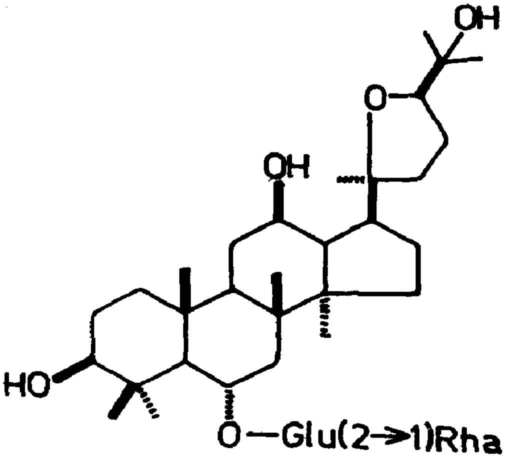
Pseudoginsenosides F_8 and F_{11} along with ginsenosides Rb_3, mp. 193°, Rd and Re isolated from leaves and characterised (*Phytochemistry* 1978, *17*, 1353).

Distribution : Nepal and eastern Himalayas, alt. 2700-4000 m.

NEW COMPOUNDS



Ginsenoside Rb_3
R = Glu(2→1)Glu
Pseudoginsenoside F_8
R = Glu[(6'-Ac)](2→1)Glu



Pseudoginsenoside F_{11}

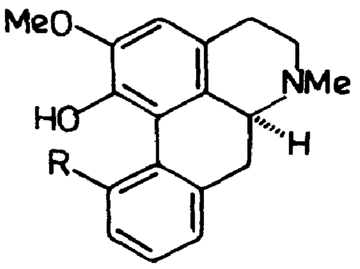
PAPAVER (Papaveraceae)

P. orientale L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 304).

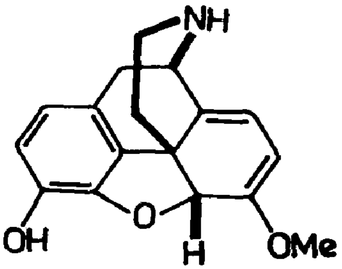
Oripavine (20.0), thebaine (9.0%) and isothebaine isolated (*J. Pharm. Sci.* 1975, *64*, 1570; *Istanbul Univ. Eczacilik Fak. Mecm.* 1977, *13*, 7; *Chem. Abstr.* 1978, *88*, 148949 d; *Pazhoohandeh* 1977, *13*, 50; *Chem. Abstr.* 1978, *88*, 101573 m); a new alkaloid - oripavidine - isolated and its structure determined (*Khim. Prir. Soedin.* 1977, *13*, 714; *Chem. Abstr.* 1978, *88*, 170357 f; *Khim. Prir. Soedin.* 1978, *14*, 474; *Chem. Abstr.* 1978, *89*, 193844 x); a new alkaloid -

isothebaidine - along with isothebaine, oripavine, oripavidine, thebaine, mecambridine, orientalidine, alpinigenine, protopine and bracteoline isolated from aerial parts (*Khim. Prir. Soedin*. 1978, *14*, 474; *Chem. Abstr.* 1978, *89*, 193844 x).

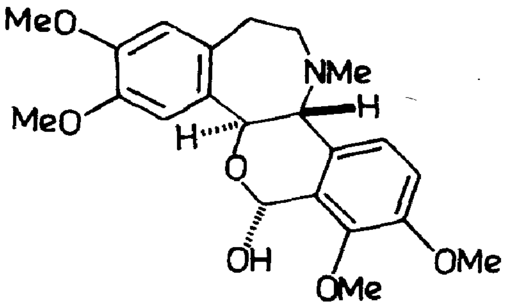
NEW COMPOUNDS



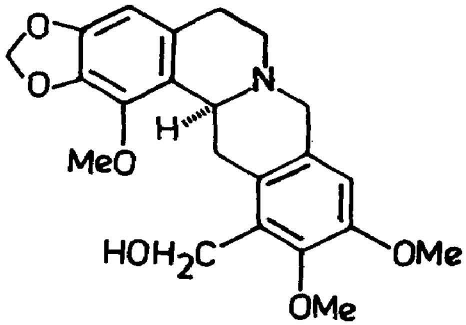
Isothebaine
R = OMe
Isothebaidine
R = OH



Oripavidine



Alpinigenine

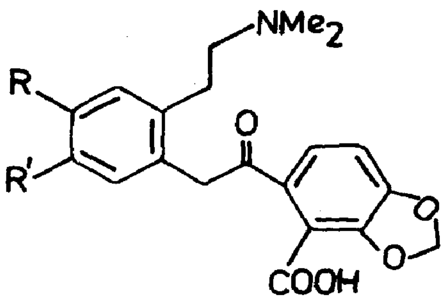


Mecambridine

P. rhoeas L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 305).

Seven glycosides of kaempferol, quercitol and luteolin isolated (*Plant. Med. Phytother.* 1971, *5*, 177; *Chem. Abstr.* 1972, *76*, 56579 g); isolation and structure elucidation of adlumidiceine, its enol lactone and adlumiceine (*Phytochemistry* 1973, *12*, 2513; *Glas. Khem. Drush. Beograd* 1975, *39*, 499; *Chem. Abstr.* 1976, *84*, 102292 y); (-)N-methylstylopinium chloride isolated (*Glas. Khem. Drush. Beograd* 1975, *39*, 499; *Chem. Abstr.* 1976, *84*, 102292 y); determination of rhoeadine content in flowers, stalk, root and leaves; content highest in flowers (*Shoyakugaku Zasshi* 1976, *30*, 187; *Chem. Abstr.* 1977, *87*, 2387 b); biosynthesis of rhoeadine (*Yakugaku Zasshi* 1977, *97*, 93; *Chem. Abstr.* 1977, *86*, 117680 p); rhoeadine, isorhoeadine, rhoeagenine, protopine, papaverrubines A,E,C and D, allocryptopine, corydine, isocorydine, 6-methoxy-2-methyl-1,2,3,4-tetrahydro-β-carboline, alkaloid MRI, coptisine, berberine and β-stylopine methohydroxide isolated from roots (*Collect. Czech. Chem. Commun.* 1978, *43*, 316).

NEW COMPOUNDS

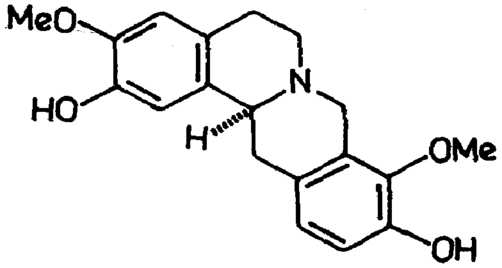


Adlumidiceine
RR' = $-OCH_2O-$
Adlumiceine
R,R' = OMe

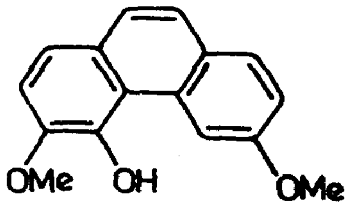
P. somniferum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 305).

Stigmasterol, β-sitosterol, nonacosanol, cyclolaudenol, cycloartenol, cycloartenone, cyclolaudenone and esters of cyclolaudenol and cycloartenol isolated (*Indian J. Chem.* 1969, *7*, 1276); thebaol isolated and characterised (*Arch. Pharm.* 1974, *307*, 814; *Chem. Abstr.* 1975, *82*, 82981 a); stepholidine [(-)2,10-dihydroxy-3,9-dimethoxytetrahydroprotoberberine] isolated (*J. Pharm. Sci.* 1975, *64*, 1040); meconic acid obtained from latex (*J. Pharm. Pharmacol.* 1976, *28*, 980); papaverine, narcotine, narcotoline, (+)laudanidine, codamine, morphine, codeine, thebaine, (+)reticuline and cotarnoline isolated from oil of poppy pods (*Khim. Prir. Soedin.* 1976, *12*, 829; *Chem. Abstr.* 1977, *86*, 103067 g); morphine N-oxide and codeine N-oxide isolated (*J. Pharm. Pharmacol.* 1976, *28*, Suppl., 70); polysaccharide fraction of capsule contained bound morphine and codeine (*Phytochemistry* 1978, *17*, 832); a method of preparation of morphine and codeine from opium described (*Farmatsiya* 1978, *28*, 20; *Chem. Abstr.* 1978, *89*, 204067 z).

NEW COMPOUNDS



Stepholidine



Thebaol

BIOLOGICAL ACTIVITY

Morphine sulphate (2 mg/kg) significantly increased serum magnesium level in rats; the increase was antagonised by nalorphine hydrochloride administered simultaneously with the

agonist (*J. Pharmacol. Exp. Ther.* 1970, *172*, 122); morphine significantly decreased content of cytochrome p-450 in male, but not in female rats; hydroxylation of progesterone and testosterone was markedly decreased in morphine-treated male rats (*J. Pharmacol. Exp. Ther.* 1970. *174*, 211); morphine at 100 mg/kg and 200 mg/kg doses increased brain acetylcholine in mice by 18 and 32% respectively (*J. Pharmacol. Exp. Ther.* 1970, *175*, 685); morphine hydrochloride (20 or 40 mg/kg) significantly elevated glucose level in blood, but did not change concentration of free fatty acids in serum of rats (*Jap. J. Pharmacol.* 1971, *21*, 5); morphine caused both local and neurally mediated decrease in vascular resistance of isolated canine gracilis muscle (*J. Pharmacol. Exp. Ther.* 1972, *180*, 359); administration of morphine (0.5 and 5.0 mg/kg, i.p. or i.v.) to unanaesthetised cats caused dose-related efflux of acetylcholine into cerebral lateral ventricle from cerebral cortex. Pretreatment with naloxone (0.1 mg/kg) prevented morphine - induced increased release (*Eur. J. Pharmacol.* 1973, *22*, 117); morphine antagonised intestinal stimulatory effect of 5-hydroxytryptamine (5-HT) in anaesthetised guinea pigs, dogs, cats and monkeys (*Eur. J. Pharmacol.* 1974, *26*, 298); administration of morphine to adult male rats decreased their body weight, thyroid weight and pituitary thyroid stimulating hormone (TSH) content and increased pituitary and adrenal weights (*Eur. J. Pharmacol.* 1974, *25*, 402); intestinal motor responses (contraction) produced by 10 and 20 μg/kg morphine were markedly reduced in intestinal segments isolated from daily morphine-treated dogs; thereby concluding that tolerance to intestinal stimulatory effect of morphine occurs in dog (*Eur. J. Pharmacol.* 1974, *25*, 302); chronic administration of morphine decreased both wet and dry weights of prostate and seminal vesicles and reduced their secretory activity (*J. Pharmacol. Exp. Ther.* 1975, *192*, 542); effect of acute administration of morphine sulphate upto 256 mg/kg, s.c., on cerebral excitability in adult male rats was investigated with flurothyl and pentylene tetrazol; morphine showed anticonvulsant activity against both drugs (*J. Pharmacol. Exp. Ther.* 1976, *198*, 655); morphine sulphate (0.5-16 mg/kg,i.v.) caused dose-related increase in intestinal intraluminal pressure in anaesthetised rats (*Eur. J. Pharmacol.* 1976, *40*, 279); subcutaneous administration of morphine hydrochloride (10 mg/kg) produced marked increase in locomotor activity in mice. Morphine-induced hyperactivity was potentiated by scopolamine and attenuated by physostigmine. Activity-increasing effects of morphine were mediated by release of catecholamines from adrenergic neurons in brain (*Jap. J. Pharmacol.* 1976, *26*, 615); both acute and chronic administration of morphine significantly lowered luteinizing hormone and testosterone levels in serum of rats. Morphine exerted its effect on hypothalamus rather than on pituitary, probably by inhibiting release of LH-releasing factor (*J. Pharmacol. Exp. Ther.* 1977, *203*, 548); morphine and azidomorphine given to cats and rats depressed spontaneous and bradykinin-induced neuronal electric activity of sensory motor cortex (*Byull. Eksp. Biol. Med.* 1977, *83*, 698; *Chem. Abstr.* 1977, *87*, 62774 k); s.c. administration of morphine twice a day in adult male rats (initial dose 20 mg/kg, dose increased by 20 mg/kg every 3 days, after 16th day dose fixed at 100 mg/kg) for 45 days caused loss of weight, hypertrophy of adrenals, decrease in weight of accessory sex organs, sperm count and in copulation rate; serum luteinizing hormone and testosterone levels were decreased, but serum FSH level was increased; results suggest that

morphine inhibits hypothalamic- pituitary-gonadal axis (*Jap. J. Pharmacol.* 1977, *27*, 65); morphine caused more side-effects than azidomorphine in humans; most frequent side-effects were vomiting, nausea and dizziness (*Kem. Kozl.* 1978, *50*, 91; *Chem. Abstr.* 1978, *89*, 191236 b); morphine sulphate (2.5-5O μg intracerebroventricularly or 1-10 mg/kg,i.v.) produced dose-related hypothermic response in conscious, unrestrained cats. It was 850 times as potent when injected into third ventricle as when given i.v. (*Br. J. Pharmacol.* 1978, *63*, 65); morphine sulphate (2.5-160 mg/kg) administered to mice at 25°, produced dose-dependent hypothermia; dose-dependence was obscured when ambient temperature was either 30° or 20° (*Factors Affecting Action Narc.* [Proc.Meet.] 1976, 631 (Pub. 1978); *Chem. Abstr.* 1978, *89*, 100200 w); morphine increased serum prolactin (PRL) level of male rats in a dose-dependent manner (*Jap. J. Pharmacol.* 1978, *28*, 803); morphine inhibited catecholamine-stimulated adenosine triphosphatase (ATP-ase) activities in mouse brain synaptosomes both *in vivo* and *in vitro*; upto 0.001M it had no effect on basal ATP- ase activities but at 0.0001M it significantly inhibited dopamine-sensitive ATP-ase activities *in vitro* (*J. Pharmacol. Exp. Ther.* 1979, *208*, 80).

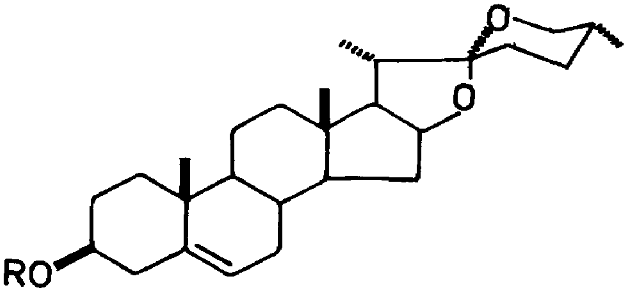
Papaverine and eupaverine increased rate of uptake of calcium by sarcoplasmic vesicles isolated from rabbit white skeletal muscle (*J. Pharm. Pharmacol.* 1971, *23*, 502); papaverine (5 mg/kg,i.v.) prolonged total duration of synchronised sleep and depressed the duration of total desynchronised sleep in deprived rats as compared to nondeprived rats (*Psychopharmacologia* 1972, *26*, 263, 275; *Chem. Abstr.* 1972, *77*, 147562 h, 147563 j); papaverine blocked $^{45}Ca^{2+}$ uptake in depolarised smooth muscles of Taenia coli of guinea pig; the blockade was less in partially depolarised muscles, which suggests that papaverine possibly competes for the same receptor site with calcium from extracellular fluid in depolarised muscle (*J. Pharm. Pharmacol.* 1973, *25*, 914); papaverine (0.026 mM) inhibited growth of and increased cyclic AMP and cyclic GMP in human neuroblastoma cultures (*IRCS Med. Sci.: Libr. Compend.* 1977, *5*, 230; *Chem. Abstr.* 1977, *87*, 78317 z).

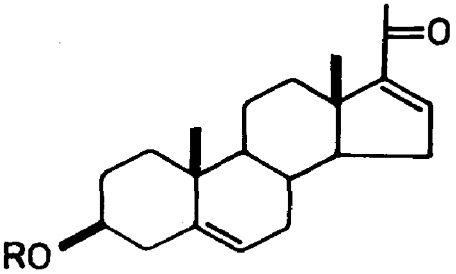
PARIS (Trilliaceae)

P. polyphylla Smith (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 307).

Saponins A,B and C isolated from tubers along with diosgenin monoglucosides; saponin C characterised as diosgenin-3-O-α-L-rhamnopyranosyl(1→4)β-D-glucopyranoside; saponin A composed of diosgenin, glucose and rhamnose (*Indian J. Chem.* 1972, *10*, 377); structure of pariphyllin, mp. 294° (saponin B) established (*Indian J. Chem.* 1972, *10*, 589); three new steroid glycosides - diosgenin-3-O-α-rhamnopyranosyl(1→2)[α-L-arabinofuranosyl-(1→4)]-β-D-glucopyranoside (I), mp. 276°, diosgenin-3-O-α-L-rhamnopyranosyl-(1→4)-α-L-rhamnopyranosyl(1→4)-[α-L-rhamnopyranosyl(1→2)]β-D-glucopyranoside (II), mp. 203° and pregna-5,16-dien-20-one-3-O-β-chacotrioside (III), mp. 260° - isolated along with dioscin (*Chem. Pharm. Bull.* 1973, *21*, 1240).

NEW COMPOUNDS





I
R = Glu[(2→1)Rha](4→1)Ara
II
R = Glu[(2→1)Rha](4→1)Rha(4→1)Rha
Saponin B
R = Glu[(4→1)Rha(3→1)Ara
Saponin C
R = Glu(4→1)Rha

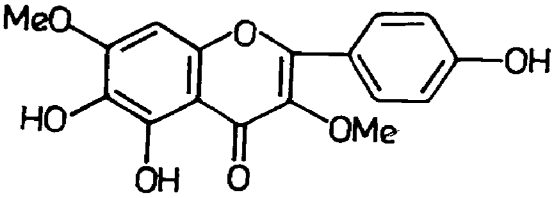
III
R = Glu[(2→1)Rha](4→1)Rha

PARTHENIUM (Asteraceae)

P. hysterophorus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 307).

A new flavonoid - 6-hydroxykaempferol-3,7-dimethyl ether - isolated along with kaempferol, quercetagetin-3,7-dimethyl ether and a quercetin-3-O-glycoside (*Phytochemistry* 1976, *15*, 1045); parthenin, hexacosanol, myricyl alcohol, β-sitosterol and its glucoside, campesterol, stigmasterol, betulin, ursolic acid and a saponin composed of oleanolic acid and glucose isolated from leaves; glucose, galactose and potassium chloride also obtained (*Indian J. Pharm.* 1977, *39*, 64).

NEW COMPOUNDS



6-Hydroxykaempferol-3,7-dimethyl ether

BIOLOGICAL ACTIVITY

Parthenin induced dose-dependent damage to human leucocyte chromosomes *in vitro*. It also induced micronuclei formation in polychromatic erythrocytes of mice (*Indian J. Exp. Biol.* 1978, *16*, 1117).

PASPALUM (Poaceae)

P. scrobiculatum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 308).

A crystalline fraction orally administered for 11 days to 14 acutely agitated psychotic patients, of whom 11 suffered from schizophrenia, had tranquillising and beneficial effects in 9 schizophrenic patients (*Indian J. Med. Sci.* 1971, *25*, 289).

Hentriacontanol, hentriacontanone, sitosterol and campesterol isolated from seeds (*Phytochemistry* 1972, *11*, 2621).

PASSIFLORA (Passifloraceae)

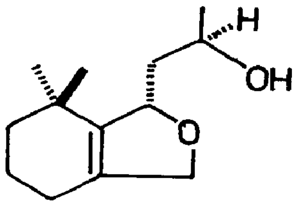
P. calcarata Masters; see *P. subpeltata* Ort.

P. coerulea L.
Eng.- Passion flower.
Harman (56 μg/100 g) present in plant (*Planta Med.* 1974, *25*, 101).
Distribution : Native of Brazil, grown in Indian gardens.

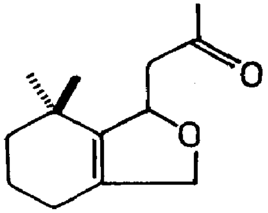
P. edulis Sims. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 186).
Eng.- Passion fruit, Purple granadilla.

Harman (85 μg/100 g) found in plant (*Planta Med.* 1974, *25*, 101); structures of edulans I and II established by synthesis as stereoisomeric 2,3,5,6-tetrahydro-2,5,5,8a-tetramethyl-(8a-H)-1-benzopyrans (*Chem. Commun.* 1974, 469); a new glycoside - passiflorine - isolated and characterised as 22R,24S-22, 31-epoxy-24-methyl-1α,3β,24,31-tetrahydroxy-9,19-cyclo-9β-lanostan-28-oic acid-β-D-glucosyl ester (*Phytochemistry* 1975, *14*, 2661); sucrose present as a major sugar in fruits (*Solo* 1976, *68*, 16; *Chem. Abstr.* 1977, *86*, 68406 t); two new ionones I and II isolated from fruits and their structures determined (*Tetrahedron Lett.* 1977, 1413); crystal structure of passifloric acid methyl ester (*J. Chem. Soc.* Perkin 2 1977, 605); megastigma-5,8-dien-4-one (E- and Z-isomers) isolated from fruits (*Helv. Chim. Acta* 1979, *62*, 67); isomeric 6-(but-2'-enylidene)-1,5,5-trimethylcyclohex-1-enes (I and II) isolated from fruits (*Aust. J. Chem.* 1979, *32*, 891); (2R,4S,4aS,8aS)-4,4a-epoxy-4,4a–dihydroedulan and (2R,3S,8aS)3-hydroxyedulan isolated from fruits and characterised (*Helv. Chim. Acta* 1979, *62*, 131); ethyl (Z)4,7-octadienoate (III) and (Z)3,5-hexadienyl butyrate (IV) isolated from fruits (*Helv. Chim. Acta* 1979, *62*, 135).

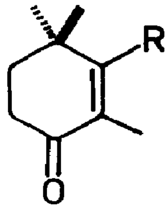
NEW COMPOUNDS



Ionone I



Ionone II

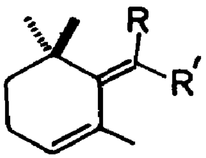


Megastigma-5,8(E)-dien-4-one

R =

Megastigma-5,8(Z)-dien-4-one

R =

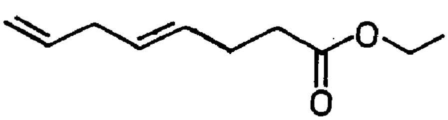


I

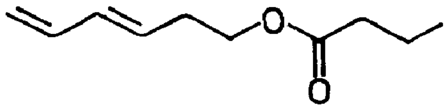
R = H, R′ =

II

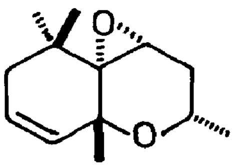
R′ = H R =



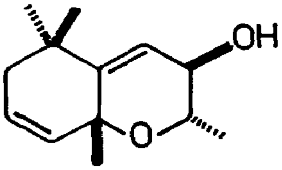
III



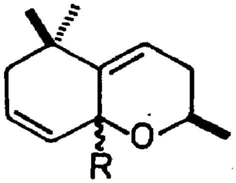
IV



4,4a-Epoxy-4,4a-dihydroedulan



3-Hydroxyedulan

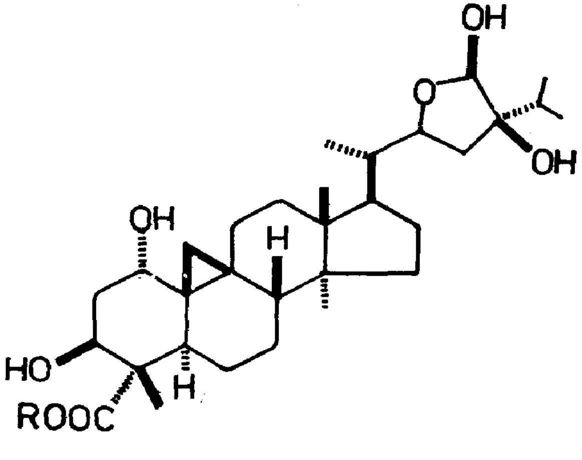


Edulan I

R = α-Me

Edulan II

R = β-Me



Passiflorine

R = Glu

Passifloric acid methyl ester

R = Me

P. foetida L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 187).

Harman (70 μg/100g) obtained (*Planta Med.* 1974, *25*, 101).

P. incarnata L.

Eng.- Maypop.

Harman (55 μg/100g) present in plant (*Planta Med.* 1974, *25*, 101).

Distribution : Native of southeast U.S.A., grown in Indian gardens.

P. subpeltata Ort. syn. *P. calcarata* Masters

Eng.- Passion flower.

Harman (39 μg/100g) obtained (*Planta Med.* 1974, *25*, 201).

Distribution : Native of Brazil, grown in Indian gardens.

PASTINACA (Apiaceae)

P. sativa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 308).

Glyceride of seed oil consisted of tripetroselinin, petroselinicdiolein and dipetroselinicolein (*Biochem. Appl.* 1969, *16*, 167; *Chem. Abstr.* 1970, *73*, 84600 p); γ-palmitolactone, cis- and trans-β-ocimene, terpinolene and trans-β-farnesene present in essential oil of leaves and shoots; essential oil from fruits contained cis-β-ocimene, hexyl butyrate, octyl acetate, octyl butyrate, octenyl butyrate and octyl caproate (*Planta Med.* 1977, *31*, 173).

PAULOWNIA (Scrophulariaceae)

P. tomentosa Steud. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 309)

Catalpinoside isolated and characterised (*C. R. Acad. Sci.* Ser. D 1971, *272*, 1443; *Chem. Abstr.* 1971, *75*, 16081 m); essential oil of flowers contained hydroquinone dimethyl ether, 1-octen-3-ol, cis-3-hexen-1-ol, 1-linalool, benzyl alcohol, phenethyl alcohol, benzaldehyde, anisaldehyde, ethyl palmitate, phenol, o-, m-, and p-cresols, 3,4-dimethoxyphenol and unidentified volatile acids; apigenin, ursolic acid, β-sitosterol and its glucoside, campesterol, stigmasterol, caffeic acid, p-hydroxybenzoic acid, p-coumaric acid and unidentified n-paraffins and fatty acids found in non-volatile residue (*Yakugaku Zasshi* 1978, *98*, 541; *Chem. Abstr.* 1979, *90*, 43660 r).

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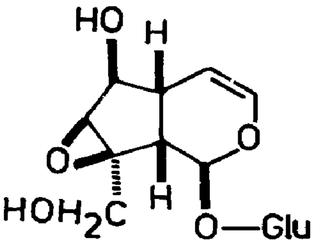

Catalpinoside

PAVONIA (Malvaceae)

P. zeylanica (L.) Cav. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 187).

Methyl 19-ketotetracosanoate isolated from stem and characterised (*Proc. Nat. Acad. Sci. India* 1978, *48*A, 158).

PEDALIUM (Pedaliaceae)

P. murex L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 187).

Pedalitin (3′,4′,5,6-tetrahydroxy-7-methoxyflavone), diosmetin and dinatin isolated from leaves (*Phytochemistry* 1972, *11*, 464); a gum isolated from leaves (*Indian J. Pharm*. 1974, *36*, 33).

PEDILANTHUS (Euphorbiaceae)

P. tithymaloides (L.) Poit.

B. - Bilati-sij; Bo. - Vilayti-sher.

Azafrin isolated from roots (*Phytochemistry* 1974, *13*, 752).

Distribution : Native of West Indies, grown in Indian gardens.

PEGANUM (Rutaceae)

P. harmala L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 309).

An alkaloid - peganidine, mp. 189° - isolated and characterised as 3-hydroxy-9-(2-oxo-propyl)pyrrolidino(2,1-b)quinazoline (*Khim. Prir. Soedin.* 1969, *5*, 599; *Chem. Abstr.* 1970, *73*, 32296 z); a new alkaloid - deoxypeganine - isolated during flowering along with 1-peganine, dl-peganine, vasicinone, deoxyvasicinone and harmine (*Khim. Prir. Soedin.* 1969, *5*, 456; *Chem. Abstr.* 1970, *72*, 75670 p); isolation and structure elucidation of pegamine (*Khim. Prir. Soedin*. 1970, *6*, 453; *Chem. Abstr.* 1971, *74*, 10342 c); a new alkaloid - ruine - isolated from seedlings and characterised as 8-hydroxyharmine-β-D-glucoside (*Phytochemistry* 1971, *10*, 231; isolation and structure determination of peganol (*Khim. Prir. Soedin.* 1971, *7*, 849; *Chem. Abstr.* 1972, *76*, 110310 c); pegaline isolated and identified as L(-)4-hydroxypipecolic acid (*Phytochemistry* 1971, *10*, 3339); another alkaloid - deoxypeganidine - isolated and its structure determined (*Khim. Prir. Soedin* 1973, *9*, 279; *Chem. Abstr.* 1973, *79*, 32158 e); isolation and structure of dipegine; isopeganidine, a racemic diastereoisomer of peganidine, quinoline and quinaldine also isolated (*Khim. Prir. Soedin.* 1974, *10*, 264; *Chem. Abstr.* 1974, *81*, 13681 v); 9,14-dihydroxyoctadecanoic acid isolated from seed oil (*Phytochemistry* 1977, *16*, 1761).

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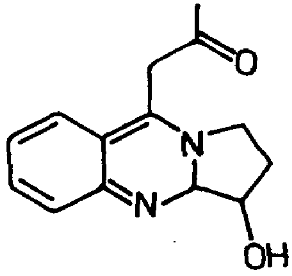
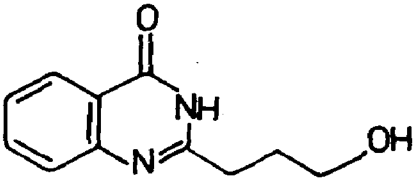
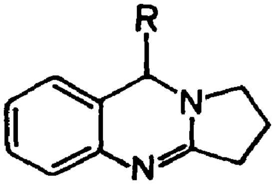


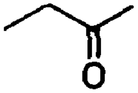
Peganidine

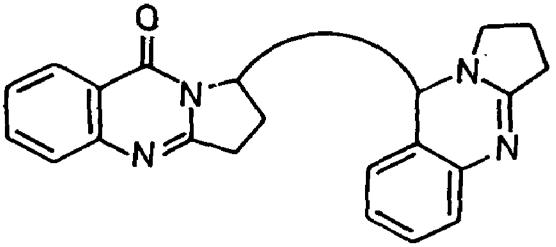


Pegamine

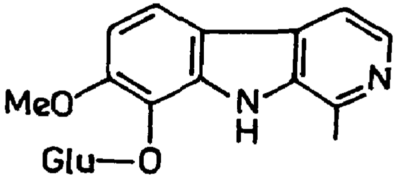


Deoxypeganine
R = H
Peganol
R = OH
Deoxypeganidine
R =





Dipegine



Ruine

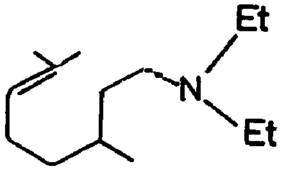
PELARGONIUM (Geraniaceae)

P. graveolens L' Herit.

Citronellyldiethylamine isolated from oil and its structure determined (*Dragoco Rep.* 1977, *24*, 150; *Chem. Abstr.* 1977, *87*, 156990 e).

Distribution : Native of South Africa, introduced and cultivated in hills of south India upto 2000 m.

NEW COMPOUNDS



Citronellyldiethylamine

P. radula L' Herit

Eng. - Scented leaved geranium.

Detection of α-citronellic acid, 1-menthone, d-isomenthone and 1-citronellol by GLC in essential oil from leaves (*Shoyakugaku Zasshi* 1978, *32*, 191; *Chem. Abstr.* 1979, *90*, 51470 u).

Distribution : Grown in gardens, specially in hilly localities.

P. roseum R. Br.

Detection of formic, propionic, capronic, caprylic and tiglic acids, 1-isomenthone, citral, citronellal, geraniol and linalool in essential oil by TLC and GLC (*Mezhdunar. Kongr. Efirnym Maslam*, [Mater.] 4th 1978, 71; *Chem. Abstr.* 1973, *79*, 83391 h); (-)epigallocatechol, (+)gallocatechol, (-)epicatechol and its gallate isolated from leaves (*Prikl. Biokhim. Mikrobiol.* 1974, *10*, 670; *Chem. Abstr.* 1975, *82*, 54201 c).

Distribution : Native of South Africa, grown in Indian gardens.

PELLAEA (Hemionitidaceae)

P. calomelanos (L.) Link; see *Pityrogramma calomelanes* (L.) Link

PELTOPHORUM (Caesalpiniaceae)

P. ferrugineum (Decne.) Benth.; see *P. pterocarpum* (DC.) Backer ex K. Heyne

P. inerme Naves; see *P. pterocarpum* (DC.) Backer ex K. Heyne

P. pterocarpum (DC.) Backer ex K. Heyne syn. *P. ferrugineum* (Decne.) Benth., *P. inerme* Naves (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 310).

β-Sitosterol and lupeol isolated from flowers (*J. Indian Chem. Soc.* 1969, *66*, 805; *Indian J. Pharm.* 1978, *40*, 15); bergenin, (-)epicatechin, (+)leucocyanidin and quercetin isolated from bark, leaves, fruits and wood (*Leather Sci.* 1970, *17*, 327; *Chem. Abstr.* 1971, *75*, 1301 j; *Leather Sci.* 1976, *23*, 352, 444; *Chem. Abstr.* 1977, *87*, 98803 h, 114610 a; *Leather Sci.* 1977, *24*, 394; *Chem. Abstr.* 1978, *89*, 211965 u); 3,3′,4-tri-O-methylellagic acid isolated from fruits (*Leather Sci.* 1977, *24*, 394; *Chem. Abstr.* 1978, *89*, 211965 u); naringenin-7-O-glucoside, mp. 212°, sucrose, glucose and fructose isolated from flowers (*Indian J. Pharm.* 1978, *40*, 15).

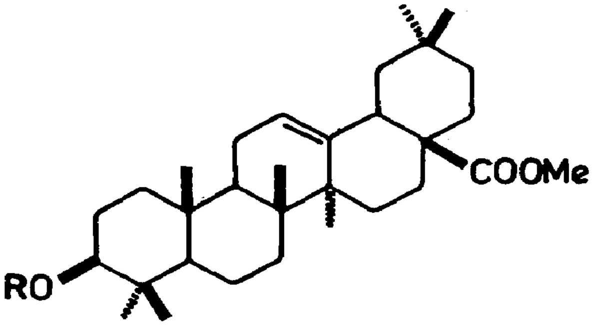
PERESKIA (Cactaceae)

P. grandifolia Haw.

Structure elucidation of a new dimethyl ester of a saponin (I) isolated from fruits (*Phytochemistry* 1974, *13*, 529).

Distribution : Introduced into India in gardens, runs wild in some places.

NEW COMPOUNDS



I R = Methyl glucuronate[(3→1)Glu](2→1)Glu

PERGULARIA (Asclepiadaceae)

P. daemia (Forsk.) Choiv. syn. *P. extensa* N.E. Br., *Daemia extensa* R. Br. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990. p. 310).

Pharmacognostic studies of root and aerial parts carried out (*J. Res. Indian Med.* 1973, *8*, 75).

Lupeol and α-amyrin and their acetates, β-sitosterol and its glucoside, calactin and calotropin isolated from roots (*Curr. Sci.* 1971, *40*, 594).

P. extensa N.E. Br.; see *P. daemia* (Forsk.) Choiv.

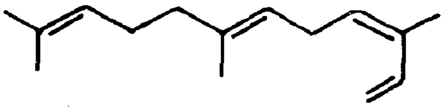
P. pallida W. & A.; see *Telosma pallida* (Roxb.) Craib.

PERILLA (Lamiaceae)

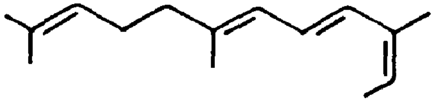
P. frutescens (L.) Britt. syn. *P. ocimoides* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 312).

Three farnesene isomers - cis-α-farnesene, trans-(C_{10})- and cis(C_{10})-allofarnesenes - isolated from essential oil together with β-farnesene and farnesol (*Bull. Chem. Soc. Jpn.* 1969, *42*, 3615); perillaldehyde isolated from essential oil (*Tap San Hoa Hoc* 1978, *16*, 24; *Chem. Abstr.* 1979, *90*, 127388 w); absolute configuration of shisonin established (*Tetrahedron Lett.* 1978, 2413).

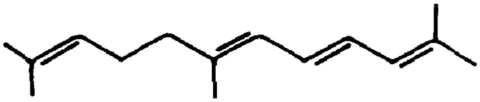
NEW COMPOUNDS



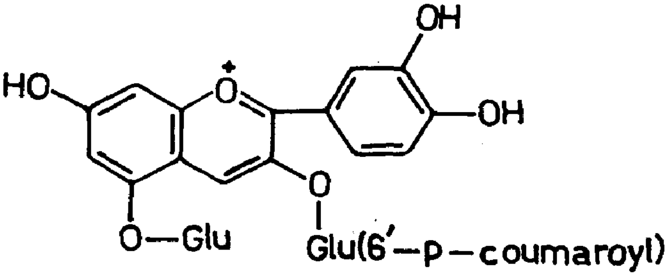
Cis-α-farnesene



Trans-α-farnesene



Allofarnesene



Shisonin

P. ocimoides L.; see *P. frutescens* (L.) Britt.

PERIPLOCA (Asclepiadaceae)

P. aphylla Decne. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 189).

Lupeol, oleanolic acid, maslinic acid, β-sitosterol and its glucoside isolated from aerial parts (*Shoyakugaku Zasshi* 1971, *25*, 7; *Chem. Aostr.* 1971, *75*, 148512 n).

PERISTROPHE (Acanthaceae)

P. bicalyculata (Retz.) Nees (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 189).

Petunidin-3-rhamnoglucoside isolated from flowers (*Vijnana Parishad Anusandhan Patrika* 1978, *21*, 177; *Chem. Abstr.* 1979, *90*, 183171 g).

PERSEA (Lauraceae)

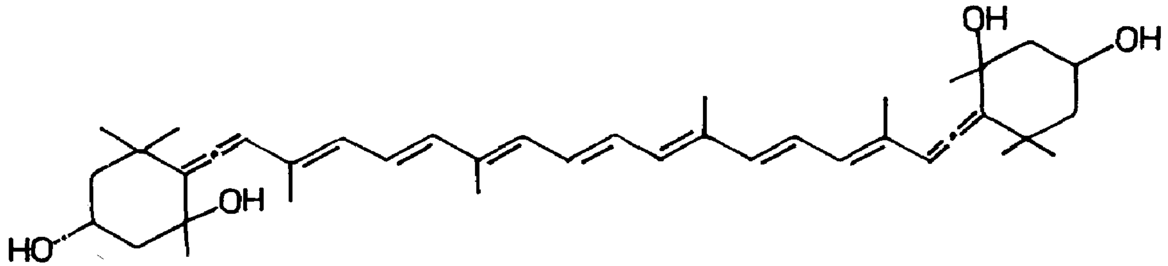
P. americana Mill.

Eng. - Avocado, Alligator pear, Butter fruit.

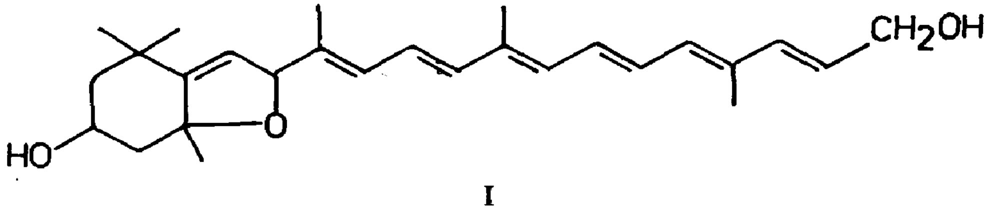
Carotenoids, α-citraurin and mimulaxanthin isolated from fruits and leaves (*Phytochemistry* 1973, *12*, 2259); 5,8-epoxy-5,8-dihydro-10'-apo-β-carotene-3,10'-diol (I) and 5,6-epoxy-5,6-dihydro-10'-apo-β-carotene-3,10'-diol (II) isolated from ripe fruits (*Phytochemistry* 1978, *17*, 1803).

Distribution : Native of central South America, introduced into India and grown in Poona, Bangalore and elsewhere in south India including foot hills of Nilgiris and Pulney Hills.

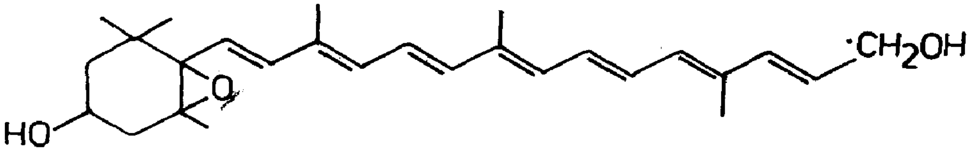
NEW COMPOUNDS



Mimulaxanthin



I

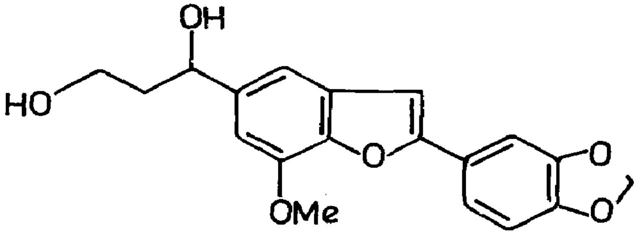


II

P. macrantha (Nees) Kostermans syn. *Machilus macrantha* Nees, *M. glaucescens* Wight (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhil 1990, p. 313).

(-)Sesamin, (+)pinoresinol dimethyl ether and homoegonol isolated from leaves along with a new norlignan - machicendiol; latter characterised as 2-(3,4-methylenedioxyphenyl)-5-(1,3-dihydroxypropyl)-7-methoxybenzofuran by partial synthesis (*Indian J. Chem*. 1976, *14*B, 613).

NEW COMPOUNDS



Machicendiol

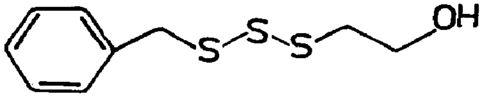
PETIVERIA (Phytolaccaceae)

P. alliacea L.

An antimicrobial substance isolated from roots and stems and its structure elucidated as benzyl-2-hydroxyethyltrisulphide (I) (*Arzneim. Forsch*. 1972, *22*, 1975).

Distribution : Native of warmer regions of America, introduced into Indian gardens.

NEW COMPOUNDS



I

PETROSELINUM (Apiaceae)

P. crispum (Mill.) A. W. Hill syn. *P. sativum* Hoffm., *Apium petroselinum* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 313).

Apigenin-7-glucoside and apigenin-7-glucoapioside isolated (*Rev. Agroquim. Tecnol. Aliment*. 1972, *12*, 263; *Chem. Abstr*. 1972, *77*, 149671 s); apiole (1.7) and myristicin (0.8%) identified by TLC in essential oil of fruits (*Khromatogr. Metody Farm*. 1978, 168; *Chem. Abstr*. 1979, *90*, 61068 h).

P. sativum Hoffm.; see *P. crispum* (Mill.) A. W. Hill

PEUCEDANUM (Apiaceae)

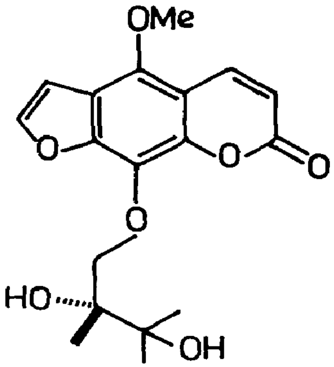
P. dhana Ham. ex Clarke (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 189).

5-Geranoxypsoralen, imperatorin and isoimperatorin isolated from seeds (*Indian J. Chem*. 1975, *13*, 1108).

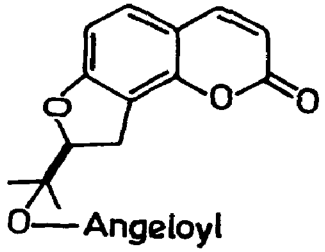
P. grande Clarke (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 189).

Columbianadin, mp. 118° and byakangelicin isolated from seeds along with imperatorin (*Lloydia* 1972, *35*, 84).

NEW COMPOUNDS



Byakangelicin



Columbianadin

P. graveolens (L.) Benth. & Hook.f.; see *Anethum graveolens* L.

P. sowa Kurz; see *Anethum graveolens* L.

PHALARIS (Poaceae)

P. aquatica L. syn. *P. tuberosa* L.

Eng. - Canary grass.

Synthesis of 2-methyl-6-methoxy-1,2,3,4-tetrahydro-β-carboline (*Aust. J. Chem.* 1974, *27*, 1367).

Distribution : Native of Mediterranean region, cultivated in India in Nilgiris.

P. arundinacea L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 189).

2-Methyl-1,2,3,4-tetrahydro-β-carboline and 2-methyl-6-methoxy-1,2,3,4-tetrahydro-β-carboline isolated (*Phytochemistry* 1976, *15*, 737).

P. tuberosa L.; see *P. aquatica* L.

PHASEOLUS (Papilionaceae)

P. aconitifolius Jacq.; see *Vigna aconitifolia* (Jacq.) Marechal

P. atropurpureus Moc. & Sesse, emend. Hassler

H. - Siratro.

Kaempferol-7-L-rhamnofuranoside and kaempferol-7-[O-L-rhamnofuranosyl(1→5)-L-rhamnofuranosido]-3-L-rhamnofuranoside isolated (*Phytochemistry* 1971, *10*, 2807).

Distribution : A native of Mexico and tropical America, introduced into Rajasthan.

P. aureus Roxb.; see *Vigna radiata* (L.) Wilczek var. *radiata*

P. calcaratus Roxb.; see *Vigna umbellata* (Thunb.) Ohwi & Ohashi

P. mungo L.; see *Vigna radiata* (L.) Wilczek var. *radiata*

P. radiatus L.; see *Vigna radiata* (L.) Wilczek var *radiata*

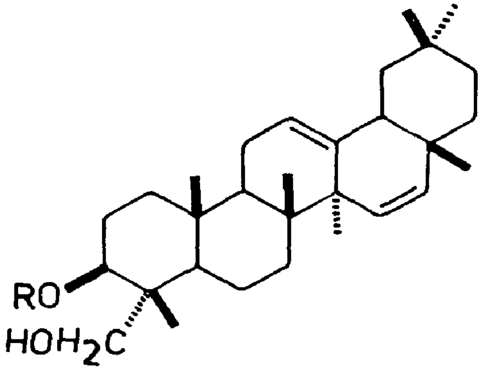
P. radiatus L. var. *aureus* (Roxb.)Prain; see *Vigna radiata* (L.) Wilczek var. *radiata*

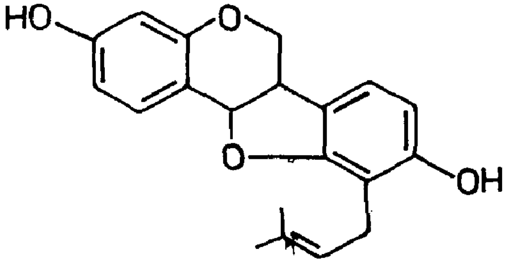
P. ricciardianus Tenore; see *Vigna umbellata* (Thunb.) Ohwi & Ohashi

P. vulgaris L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 314).

β-Sitosterol-β-D-glucopyranoside isolated (*Khim. Prir. Soedin.* 1970, *6*, 491; *Chem. Abstr.* 1971, *74*, 1057 p); saponins - phaseolosides A,B,C,D and E - isolated from legumes (*Khim. Prir. Soedin.* 1970, *6*, 377; *Chem. Abstr.* 1970, *73*, 99161 v); structure of phaseoloside D determined (*Khim. Prir. Soedin.* 1970, *6*, 559; *Chem. Abstr* 1971, *74*, 31934 q); structure of phaseoloside E determined (*Khim. Prir. Soedin.* 1970, *6*, 563; *Chem. Abstr.* 1971, *74*, 31935 r); three new antifungal isoflavanoids - phaseollidin, phaseollinisoflavin and kievitone - isolated from bean tissue infected with tobacco necrosis virus (*Tetrahedron Lett.* 1972, 4175); delphinidin-3-monoglucoside, petunidin-3-monoglucoside, malvidin-3-monoglucoside and malvidin-3,5-diglucoside isolated from seeds (*Eiyo To Shokuryo* 1972, *25*, 427; *Chem. Abstr.* 1972, *77*, 137394 r); kaempferol-3-monoglucuronide, quercetin-3-monoglucuronide, quercetin-3-xyloglucoside, rutin, nicotiflorin, p-coumarylglucose, ferulylglucose, caffeylglucose and p-3-coumaryl-3-ferulylquinic acid isolated from leaves (*C. R. Acad. Sci.* Ser. D 1972, *274*, 3402; *Chem. Abstr.* 1972, *77*, 85550 s); kievitone isolated from Rhizoctonia infected beans (*Physiol. Plant Pathol.* 1973, *3*, 293; *Chem. Abstr.* 1973, *79*, 126242 e); vomifoliol, dehydrovomifoliol and 4′-dihydrophaseic acid isolated from roots; latter also from nonimbibed seed (*Chem. Lett.* 1973, 245; *Chem. Abstr.* 1973, *78*, 156570 g; *Planta* 1973, *112*, 87; *Chem. Abstr.* 1973, *79*, 63523 z; *Phytochemistry* 1975, *14*, 1045); an antifungal isoflavan - 2′-methoxyphaseollinisoflavan - isolated from diseased bean (*Phytochemistry* 1973, *12*, 1791); 9,10,13-trihydroxyoctadecanoic acid, mp. 135° isolated from roots (*Chem. Lett.* 1973, 445; *Chem. Abstr.* 1973, *79*, 63557 p); a cytokinin glucoside - 6-(4-O-β-D-glucosyl-3-methylbutylamino) purine - isolated from leaves (*Planta* 1977, *135*, 285; *Chem. Abstr.* 1977, *87*, 98848 b); crystal structure of phaseollin (*Tetrahedron Lett.* 1977, 2981); 17β-estradiol present in plant (*Z. Pflanzenphysiol.* 1978, *90*, 45; *Chem. Abstr.* 1978, *89*, 193891 k); antifungal isoflavonoid - phaseoluteone - isolated from fungus-infected plant along with genistein, 2′-hydroxygenistein and dalbergioidin (*Phytochemistry* 1979, *18*, 363).

NEW COMPOUNDS





Phaseoloside D

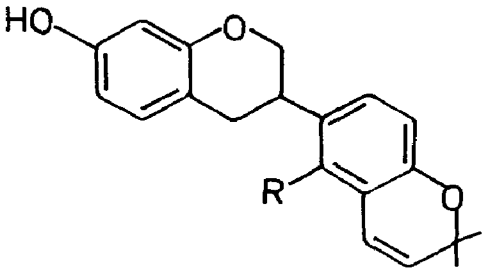
R = X-Glu(4→1)Ara[(2→1)Glu](6→1)Rha

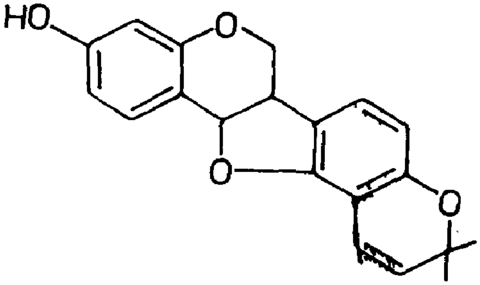
Phaseoloside E

R = X-Ara(4→1)Ara[(6→1)Rha](2→1)Glu(4→1)Ara(4→1)Ara

X = Gluc.acid(3→1)Gal(2→1)

Phaseollidin





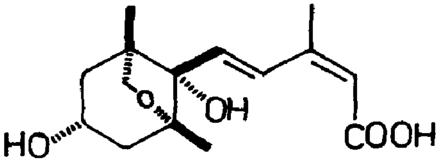
Phaseollinisoflavan

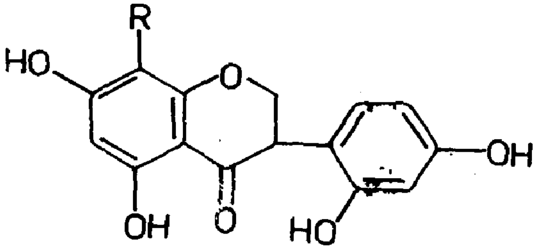
R = OH

2′-Methoxyphaseollinisoflavan

R = OMe

Phaseollin





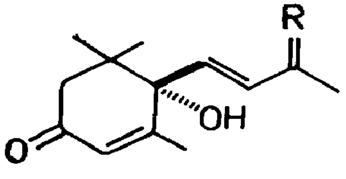
4′-Dihydrophaseic acid

Dalbergioidin

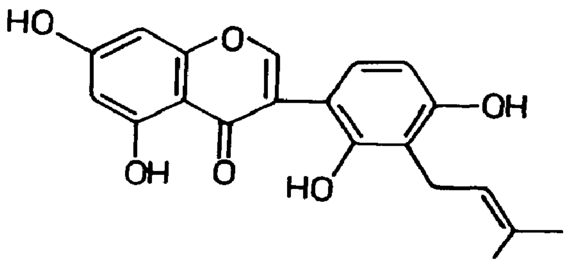
R = H

Kievitone

R =



Vomifoliol
R = OH, H
Dehydrovomifoliol
R = O



Phaseoluteone

BIOLOGICAL ACTIVITY

9,10,13-Trihydroxyoctadecanoic acid stimulated hatching of soyabean cyst nematode (*Heterodera glycines*) eggs at a concentration of 1 μg/ml in water at room temperature (*Chem. Lett.* 1973, 445; *Chem. Abstr.* 1973, *79*, 63557 p).

PHAULOPSIS (PHAYLOPSIS) (Acanthaceae)

P. imbricata (Forsk.) Sweet syn. *P. parviflora* Willd.

Bo. - Waiti, Ran-maushi.

β- And γ-sitosterols isolated from leaves (*J. Indian Chem. Soc.* 1973, *50*, 556).

Distribution : Throughout India, excepting north-western region and ascending to 900 m in the hills.

P. parviflora Willd.; see *P. imbricata* (Forsk.) Sweet

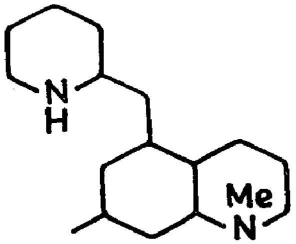
PHLEGMARIURUS (Huperziaceae)

P. phlegmaria (L.) Sen & Sen syn. *Lycopodium phlegmarium* L. (*phlegmaria*).

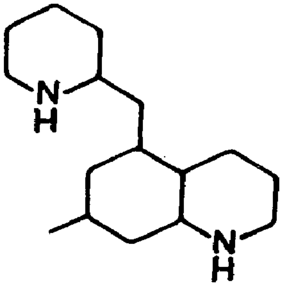
Phlegmanols A,B,C,D,E and phlegmaric acid isolated along with serratenediol, its 3-acetate, serratriol, hydroxyserratenone and tohogenol (*Chem. Commun.* 1970, 1118; *J. Chem. Soc.* C 1971, 3109); phlegmanol F isolated and its structure determined (*Chem. Pharm. Bull.* 1971, *19*, 2640); lycodoline, anhydrolycodoline, lycoflexine and gnidioidine along with two minor new alkaloids - phlegmarine and Nβ-methylphlegmarine - isolated (*Can. J. Chem.* 1978, *56*, 851).

Distribution : West Bengal, Assam, Sikkim, Arunachal Pradesh, Kerala and Andaman & Nicobar Islands.

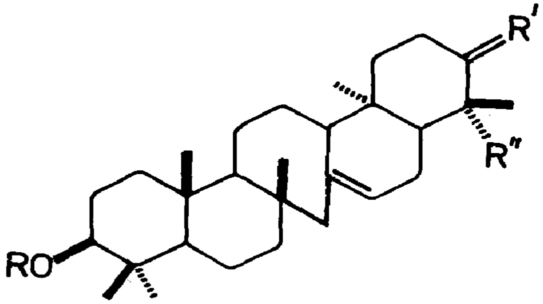
NEW COMPOUNDS



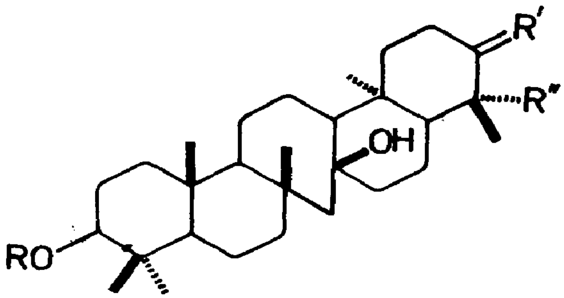
Nβ-Methylphlegmarine



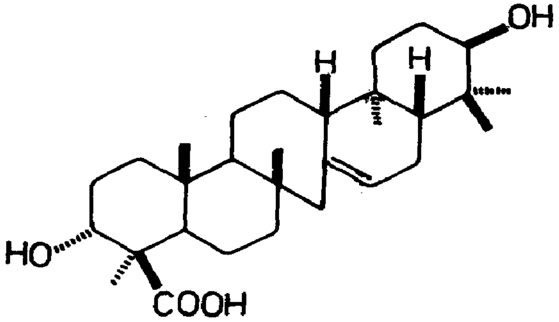
Phlegmarine



Phlegmanol A
R = Dihydrocaffeoyl, R' = H,α-OH, R'' = Me
Phlegmanol B
R = Feruloyl, R' = H,α-OH, R'' = Me
Phlegmanol C
R = Ac, R' = H,β-OH, R'' = Me
Phlegmanol E
R = H, R' = H,β-OH, R'' = CH_2OH



Phlegmanol D
R = Ac, R' = O, R'' = Me
Phlegmanol F
R = H, R' = H,α-OH,
R'' = CH_2OH



Phlegmaric acid

PHLOX (Polemoniaceae)

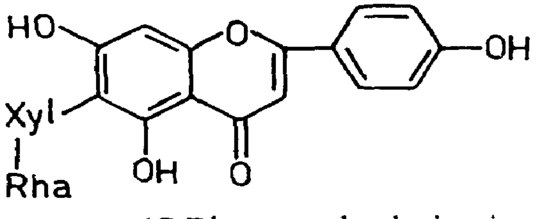
P. drummondii Hook.

Eng. - Drummond phlox.

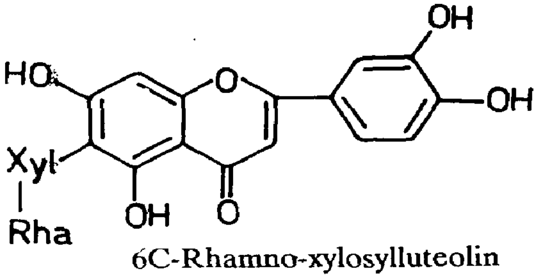
New C-glycosyl flavones - 6C-rhamno-xylosylapigenin and 6C-rhamno-xylosylluteolin - isolated from flowers (*Phytochemistry* 1971, *10*, 677).

Distribution : Native of North America, grown in Indian gardens.

NEW COMPOUNDS



6C-Rhamno-xylosylapigenin



6C-Rhamno-xylosylluteolin

PHOENIX (Arecaceae)

P. dactylifera L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 190).

Hemicellulose isolated from pollen grains contained arabinose (46.0), galactose (25.0), xylose (18.0), rhamnose (9.0) and uronic acid (2.0%) (*Carbohyd. Res.* 1972, *25*, 261; *Chem. Abstr.* 1973, *78*, 58708 p).

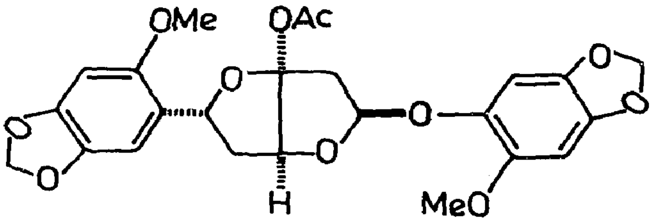
PHRYMA (Phrymataceae)

P. leptostachya L.

Phrymarolin-I isolated and its structure determined (*Agric. Biol. Chem.* 1972, *36*, 1013; *Chem. Abstr.* 1972, *77*, 114277 r).

Distribution : Western Himalayas from Kashmir to Nepal, alt. 900- 2100 m and Khasi Hills, alt. 1200-1800 m.

NEW COMPOUNDS



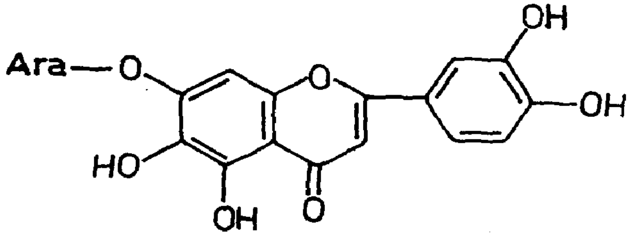
Phrymarolin-I

PHYLA (Verbenaceae)

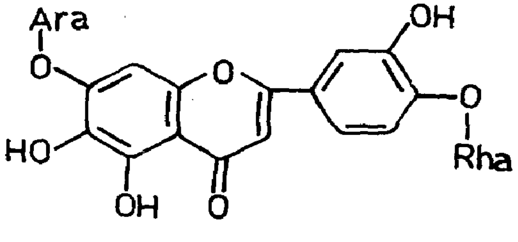
P. nodiflora (L.) Greene syn. *Lippia nodiflora* Mich. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, p. 314).

Nodifloridins A and B isolated (*Vijnana Parishad Anusandhan Patrika* 1968, *11*, 219; *Chem. Abstr.* 1970, *73*, 95454 v); nodifloretin isolated from leaves (*Trans. Bose Res. Inst.* Calcutta 1971, 33; *Chem. Abstr.* 1973, *78*, 97440 q); two new flavone glycosides - lippiflorin A and lippiflorin B - isolated and characterised as 3′,4′,5,6-tetrahydroxy-7-O-L-arabinosyl flavone and 4′-O-L-rhamnoside of lippiflorin A respectively (*Indian J. Chem.* 1973, *11*, 1316).

NEW COMPOUNDS



Lippiflorin A



Lippiflorin B

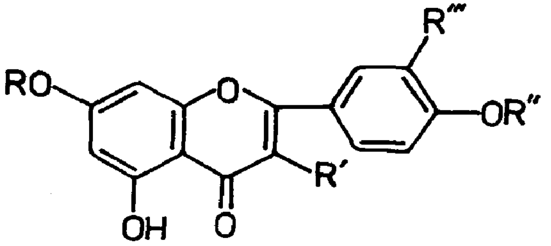
PHYLLANTHUS (Euphorbiaceae)

P. emblica L.; see *Emblica officinalis* Gaertn.

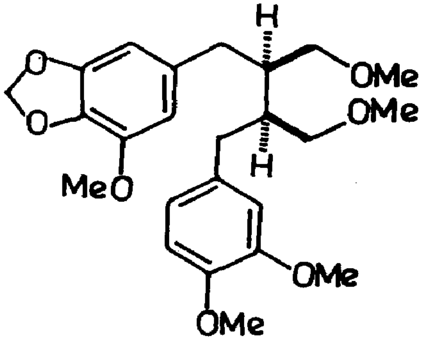
P. fraternus Webster syn. *P. niruri* sensu Hook.f. (non L.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 314).

Three new lignans - niranthin, nirtetralin and phyltetralin - isolated from leaves (*Tetrahedron* 1973, *29*, 1291); detection of estradiol in bark and roots by TLC; estradiol content 155-350 μg/100 g in plant samples (*Bangladesh J. Biol. Sci.* 1976, *5*, 45; *Chem. Abstr.* 1979, ***90***, 3135 s); kaempferol-4′-rhamnopyranoside and eriodictyol-7-rhamnopyranoside isolated from roots (*Planta Med.* 1977, *32*, 217); lup-20(29)-en-3β-ol and its acetate isolated from roots (*J. Indian Chem. Soc.* 1979, *56*, 326).

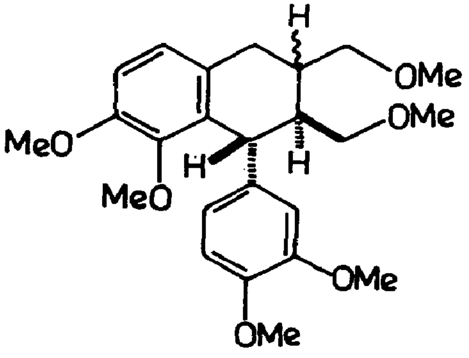
NEW COMPOUNDS



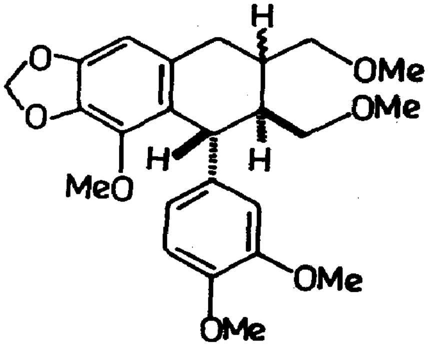
Kaempferol-4′-rhamnopyranoside
R, R‴ = H, R′ = OH, R″ = Rha
Eriodictyol-7-rhamnoside
R = Rha, R′ = H, R″, R‴ = OH



Niranthin



Phyltetralin



Nirtetralin

PHYLLARTHRON (Bignoniaceae)

P. comorense DC.

Lapachol, dehydrotectol, dehydro-α-lapachone, β-lapachone, tectol, paulownin, paulownin methanolate, β-sitosterol and hentriacontanol isolated from heartwood and stem bark (*Phytochemistry* 1973, *12*, 469; *Indian J. Chem.* 1975, *13*, 869).

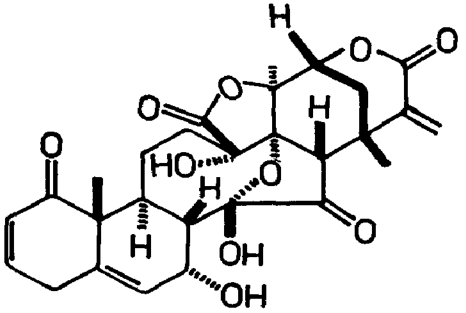
Distribution : Indigenous to Madagascar; grown in Indian gardens.

PHYSALIS (Solanaceae)

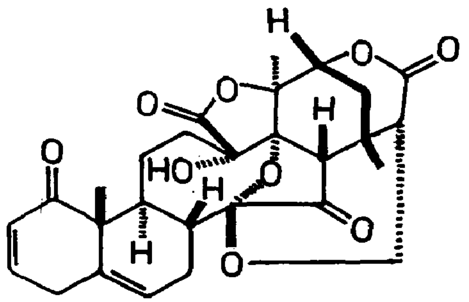
P. alkekengi L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 315).

Structure of physalin A and physalin B elucidated (*J. Chem. Soc.* C 1970, 664); crystal structure of physalin A (*J. Chem. Soc.* B 1970, 812); tigloidine (3.0), 3α-tigloyloxytropane (33.0), cuscohygrine (20.0%) and tropine isolated from roots (*Phytochemistry* 1973, *12*, 2557); a new withanolide - physalactone - isolated and characterised as 4β,17,20(R)-trihydroxy-3-methoxy-1-oxo-5β,6β-epoxy-22(R)witha-8(14), 24-dienolide (*Khim. Prir. Soedin.* 1977, *13*, 531; *Chem. Abstr.* 1977, *87*, 197259 s); reinvestigation showed physoxanthin to be identical to α-cryptoxanthin (*Phytochemistry* 1978, *17*, 2037).

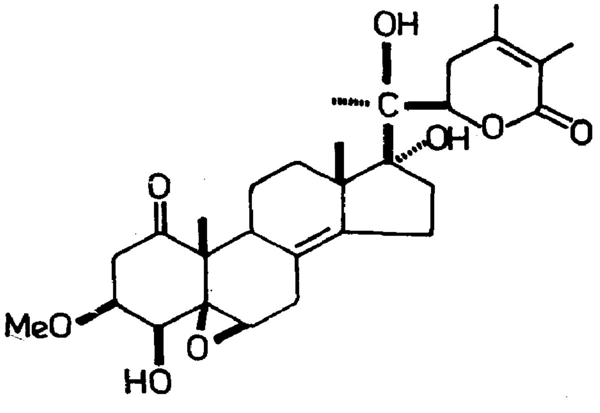
NEW COMPOUNDS



Physalin A



Physalin B

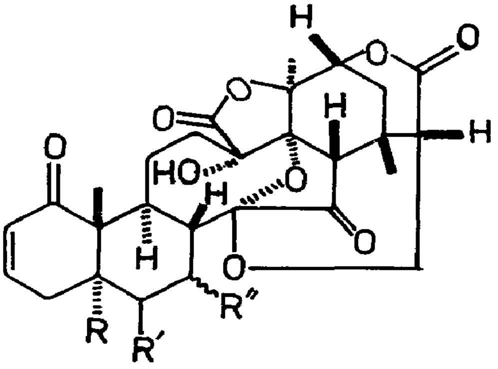


Physalactone

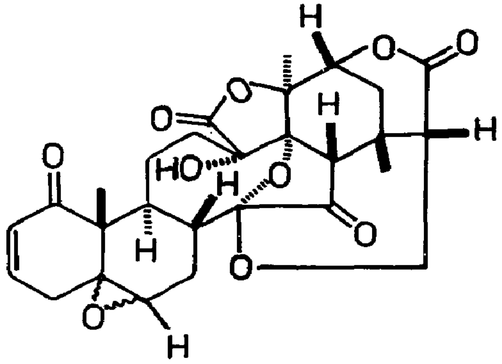
P. angulata L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 191).

Physalin B isolated (*Indian J. Pharm.* 1970, *32*, 163); physalins E,F,G,H and I isolated from stems and leaves; structures of physalins E and H determined (*Phytochemistry* 1978, *17*, 1641); structures of physalins F and J determined (*Phytochemistry* 1978, *17*, 1647).

NEW COMPOUNDS



Physalin E
R = OH, R′ = H, R″ = α-OH
Physalin H
RR′ = Δ, R″ = β-OH



Physalin F
5β,6β-epoxy
Physalin J
5α,6α-epoxy

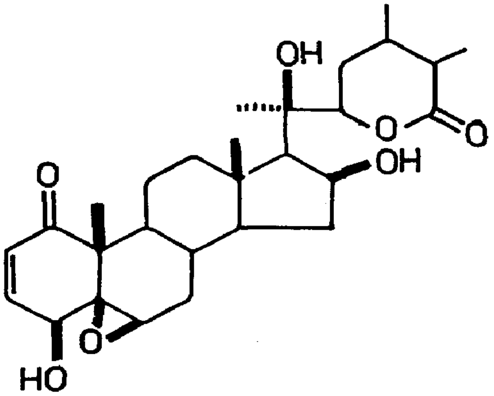
P. ixocarpa Brot. ex Hornem

Eng. - Tomatillo, Mexican or Mayan husk tomato.

A new withanolide - withaphysacarpin - isolated from leaves along with physalin B and characterised as 4β,20(R),16β-trihydroxy-5β,6β-epoxy-1-oxo-22(R)with-2-enolide (*Indian J. Pharm.* 1973, *35*, 36).

Distribution : Native of Mexico and Guatemala; introduced into India and cultivated.

NEW COMPOUNDS

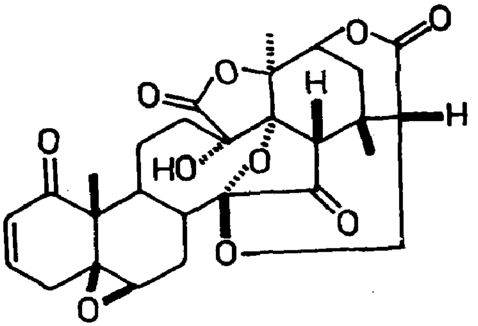


Withaphysacarpin

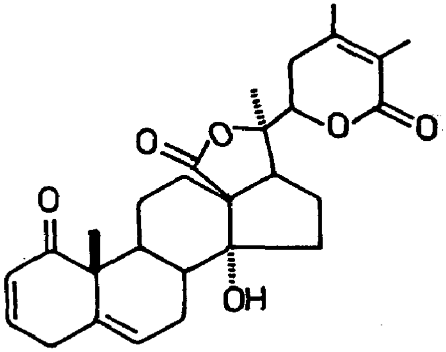
P. minima L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 192).

5β,6β-Epoxyphysalin B, withaphysalins A,B and C along with physalin B isolated from leaves and characterised (*J. Chem. Soc.* Perkin 1 1975, 1370; *ibid.* 1976, 1244); new dihydroxyphysalin B, mp. 302°, isolated from leaves along with physalins A,B and C (*Lloydia* 1976, *39*, 405).

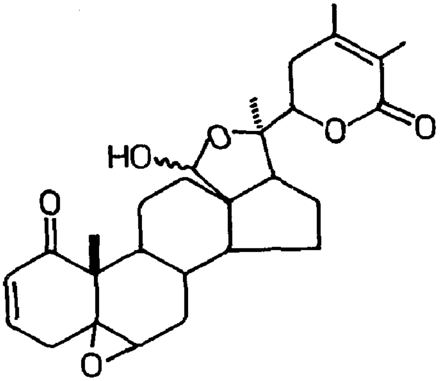
NEW COMPOUNDS



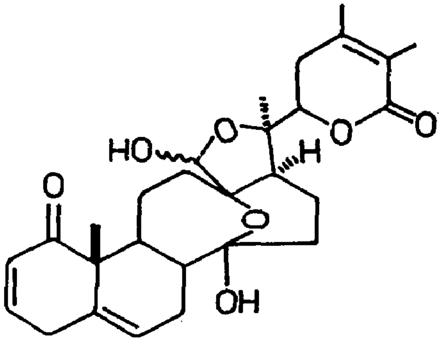
5β,6β-Epoxyphysalin B



Withaphysalin A



Withaphysalin B

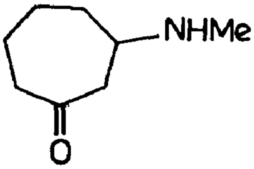


Withaphysalin C

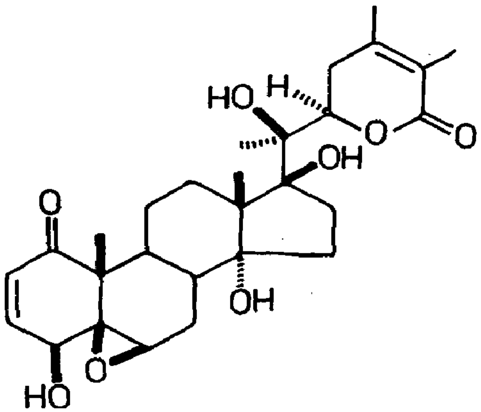
P. peruviana L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 192).

A new withanolide - 4β-hydroxywithanolide E - isolated from leaves in addition to withanolide E (*Phytochemistry* 1976, *15*, 340; *Chem. Pharm. Bull.* 1976, *24*, 1403); physalin A and 2,3-dihydrowithanolide E isolated from leaves (*Phytochemistry* 1976, *15*, 340); a new alkaloid - physoperuvine - isolated from roots (*Chem. Ind.* 1976, 454); a new withanolide - physalolactone, mp. 227° - isolated from leaves and characterised as (17S,20S,22R)6α-chloro-4β,5β,14α,17β,20-pentahydroxy-1-oxowitha-2,24-dienolide (*J. Indian Chem. Soc.* 1978, *55*, 1175); withanolide S isolated from leaves and characterised as (17S,20S,22R)- 5α, 6β, 14α,17β, 20α-pentahydroxy-1-oxowitha-2,24-dienolide (*Indian J. Pharm. Sci.* 1978, *40*, 177).

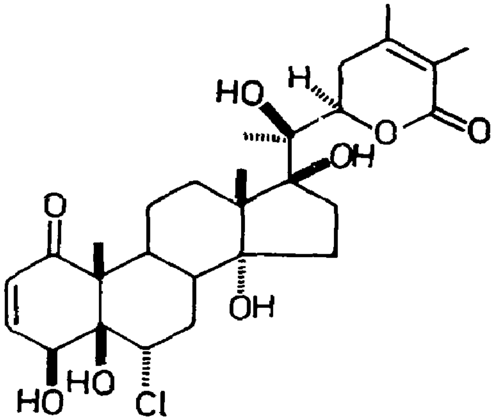
NEW COMPOUNDS



Physoperuvine



4β-Hydroxywithanolide E



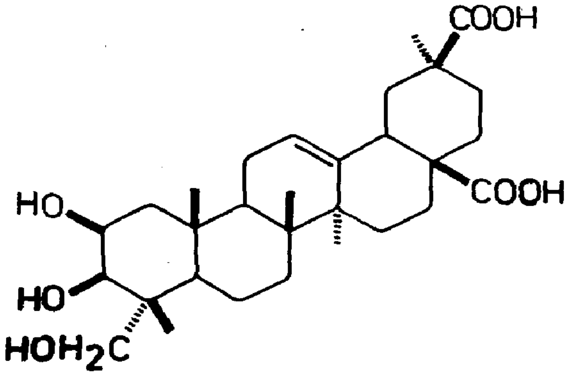
Physalolactone

PHYTOLACCA (Phytolaccaceae)

P. acinosa Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 192).

Spergulagenic acid, jailigonic acid, acinosolic acid and β-sitosterol isolated from fruits (*Planta Med.* 1975, *27*, 367; *Indian J. Chem.* 1976, *14*, 475); myristic acid, n-pentacosane, lignoceryl palmitate, 16-hentriacontanol, ursolic acid and its galactoside isolated from fruits (*Planta Med.* 1977, *32*, 225).

NEW COMPOUNDS



Acinosolic acid

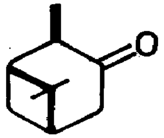
PICEA (Pinaceae)

P. abies (L.) Karst. syn. *Abies excelsa* DC. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 192).

Anhydride of 2-O-(α-D-galactopyranosyluronic acid)-L-rhamnose identified (*Acta Chem. Scand.* 1972, *26*, 837); bark contained free and esterified fatty acids (C_{12}-C_{24}), fatty alcohols (C_{18}-C_{25}), abietane and pimarane type resin acids, ferulic esters, p-hydroxycinnamic esters, β-sitosterol, campesterol, p-cymene, borneol, terpineol, α-longipinene, longifolene, γ-

muurolene, 3α-methoxyserrat-14-en-21β-ol, 21α-methoxyserrat-14-en-3-one and 3β-methoxyserrat-14-en-21β-ol (*Acta Chem. Scand.* 1972, *26*, 2289); α-pinene oxide, pinocamphone, isopinocamphone and cuminol along with pinocarvone, fenchol, O-methylthymol, myrtenal, trans-pinocarveol, trans-verbenol, verbenone, (-)carvone, cuminal, α-terpenyl acetate and 8-hydroxy-p-cymene identified by GCMS in volatile constituents from bark (*Planta Med.* 1977, *32*, 342); shikimic and quinic acids isolated as major acidic constituents from needles (*Phyton* 1978, *18*, 137; *Chem. Abstr.* 1978, *89*, 160131 j).

NEW COMPOUNDS



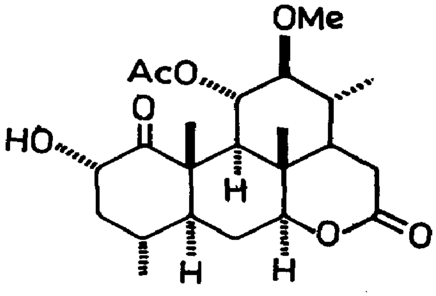
Pinocamphone
(1S, 2S, 5S)
Isopinocamphone
(1R, 2R, 5S)

PICRASMA (Simaroubaceae)

P. quassioides (D. Don) Benn. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 192).

Isolation of picrasin C from tree wood and elucidation of its stereostructure (*Chem. Pharm. Bull.* 1971, *19*, 2211).

NEW COMPOUNDS



Picrasin C

PICRIS (Asteraceae)

P. hieracioides L. ssp. *kaimaensis* Kitamura syn. *P. hieracioides* sensu Hook.f. (non L.) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 192).

β- And γ-sitosterols isolated from leaves (*J. Indian Chem. Soc.* 1973, *50*, 556).

P. hieracioides L.; see *P. hieracioides* L. ssp. *kaimaensis* Kitamura

PICRORHIZA (Scrophulariaceae)

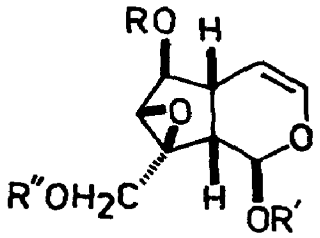
P. kurrooa Royle ex Benth. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 315).

Pharmacognostic studies of inflorescence, rhizome and roots (*J. Res. Indian Med.* 1971, *6*, 300).

Kutaki increased bile flow in dog (*J. Res. Indian Med.* 1970, *5*, 11); alcoholic extractive was effective in chronic carbon tetrachloride-induced hepatotoxicity in rat (*J. Res. Indian Med. Yoga & Homoeo.* 1976, *11*, 12).

Structure of kutkin isolated from roots (*Experientia* 1970, *26*, 818; *J. Org. Chem.* 1970, *35*, 3159); apocynin (4-hydroxy-3-methoxyacetophenone) isolated (*Curr. Sci.* 1971, *40*, 603); a new iridoid glucoside - picroside I - isolated and characterised as 6'-O-trans-cinnamoyl-catalpol (*Chem. Pharm. Bull.* 1971, *19*, 2534; *Ann. Chem.* 1972, *759*, 173; *ibid.* 1977, 1053); crystalline kutkin shown to be a stable mixed crystal of picroside I and a new glucoside - kutkoside; structure of latter elucidated as 10-O-vanilloylcatalpol (*Indian J. Chem.* 1972, *10*, 29); new iridoid glucoside - picroside II - isolated and characterised as 6-vanilloylcatalpol (*Ann. Chem.* 1972, *759*, 173; *ibid.* 1977, 1053); picroside III isolated and characterised as 6'-(4-hydroxy-3-methoxycinnamoyl) catalpol (*Ann. Chem.* 1977, 1053).

NEW COMPOUNDS



Picroside I
R,R′ = H, R′ = Glu(6′-cinnamoyl)
Picroside II
R = Vanilloyl, R′ = Glu, R″ = H
Picroside III
R,R″ = H, R′ = Glu(6′-feruloyl)
Kutkoside
R = H, R′ = Glu, R″ = vanilloyl

BIOLOGICAL ACTIVITY

Apocynin showed choleretic activity. It produced moderate to marked relaxation of rabbit ileum and contracting rat uterus and antagonised spasmogen-induced spasms on guinea pig ileum. It had depressant action on frog heart but showed no significant effect on blood pressure (*Curr. Sci.* 1971, *40*, 603).

PIERIS (Ericaceae)

P. formosa D. Don; see *Lyonia formosa* (Wall.) Hand.-Mazz.

P. ovalifolia D. Don; see *Lyonia ovalifolia* (Wall.) Drude

PIMPINELLA (Apiaceae)

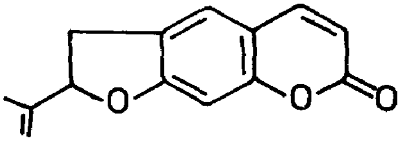
P. anisum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 316).

Essential oil from seeds (1.05-1.1%) contained cis-anethole, carvone, β-caryophyllene, dihydrocarvyl acetate, estragole and limonene (*Can. J. Plant Sci.* 1977, *57*, 681; *Chem. Abstr.* 1977, *87*, 172697 v).

P. diversifolia DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 193).

Ammirin (isoangenomalin) and oxypeucedanin isolated from aerial parts (*J. Indian Chem. Soc.* 1978, *55*, 198).

NEW COMPOUNDS



Ammirin

P. monoica Dalz.; see *P. wallichiana* (Miq.) Gandhi

P. wallichiana (Miq.) Gandhi syn. *P. monoica* Dalz.

Bergapten and isopimpinellin isolated from seeds (*J. Indian Chem. Soc.* 1970, *47*, 617).

Distribution : Southern part of Western Ghats.

PINUS (Pinaceae)

P. caribaea More

Eng. - Honduras pine, Caribbean pitch-pine

Detection of α-pinene, β-pinene, 3-carene, β-phellandrene, myrcene and limonene in oil from needles by GLC (*J. Chromatogr. Sci.* 1978, *16*, 294; *Chem. Abstr.* 1978, *89*, 126144 f).

Distribution : Native of Caribbean region; recorded that it was successfully grown in Assam and Dehradun.

P. longifolia Roxb.; see *P. roxburghii* Sargent

P. roxburghii Sargent syn. *P. longifolia* Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 316).

Friedelin, ceryl alcohol and β-sitosterol isolated from bark (*Indian J. Chem.* 1970, *8*, 469); hexacosyl ferulate isolated and structure confirmed by synthesis (*Phytochemistry* 1977, *16*, 397).

PIPER (Piperaceae)

P. aurantiacum Wall. ex Hook.f.; see *P. wallichii* (Miq.) Hand.- Mazz.

P. betel L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 194).

β-Sitosterol isolated from roots (*Indian J. Pharm.* 1971, *35*, 118).

P. brachystachyum Wall. ex Hook.f.; see *P. mullesua* D. Don

P. chaba Hunter; see *P. retrofractum* Vahl

P. cubeba L.f. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 194).

Two new sesquiterpene hydrocarbons - bicyclosesquiphellandrene and 1-epibicyclosesquiphellandrene - isolated from essential oil (*Phytochemistry* 1974, *13*, 1183).

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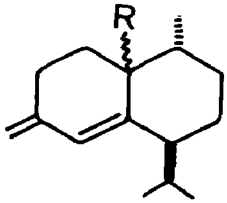


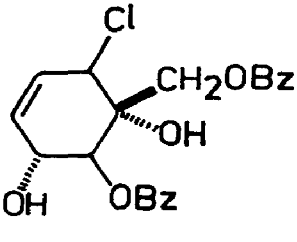
Bicyclosesquiphellandrene
R = β-H
1-Epibicyclosesquiphellandrene
R = α-H

P. hookeri Miq.

Caryophyllene epoxide isolated from oil (*Curr. Sci.* 1970, *39*, 182); pipoxide chlorohydrin isolated (*Indian J. Pharm.* 1971, *33*, 50).

Distribution : Western Ghats.

NEW COMPOUNDS



Pipoxide chlorohydrin

P. longum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 316).

Piperlongumine, piperlonguminine, piperine, sesamin, methyl 3,4,5-trimethoxycinnamate isolated from roots (*Indian J. Chem.* 1977, *15*B, 583).

P. mullesua D. Don syn. *P. brachystachyum* Wall. ex Hook.f.

H. - Pahari pipar, Pahari pan.

Structure of caryophyllene epoxide isolated from oil (*Curr. Sci.* 1970, *39*, 182); sylvetin, sesamin and asarinin isolated from seeds (*Indian J. Chem.* 1976, *14*B, 389).

Distribution : Himalayas from Simla to Bhutan, alt. 600-1500 m, Khasia Hills alt. 900-1500 m and Nilgiri Hills alt. 1500 m.

P. nepalense Miq.

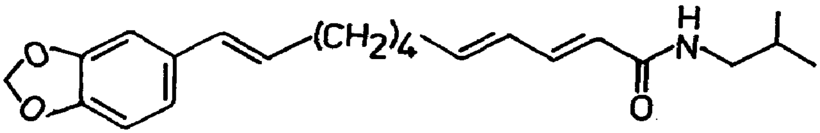
Caryophyllene oxide, triacontanol, sitosterol, N-(2-methylpropyl) deca-trans-2, trans-4-dienamide, piperine and piperlonguminine isolated from stems (*Phytochemistry* 1972, *11*, 2646).

Distribution : Himalayas from Garhwal to Bhutan and Meghalaya, alt. 900-1500 m.

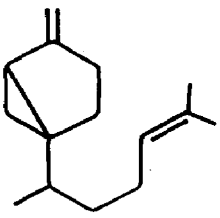
P. nigrum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 317).

Isolation and structure determination of sesquisabinene (*Can. J. Chem.* 1975, *53*, 3285); piperine, hentriacontan-16-one, hentriacontane and β-sitosterol isolated from stems (*J. Indian Chem. Soc.* 1977, *53*, 1162); a new amide - pipercide - isolated from fruits and characterised as isobutylamide of 11-(3,4-methylenedioxyphenyl)-2E,4E,10E-undecatrienoic acid (*Agric. Biol. Chem.* 1979, *43*, 1609; *Chem. Abstr.* 1979, *91*, 154269 k).

NEW COMPOUNDS



Pipercide



Sesquisabinene

BIOLOGICAL ACTIVITY

Pipercide showed insecticidal activity against adzuki bean weevil (*Agric. Biol. Chem.* 1979, *43*, 1609; *Chem. Abstr.* 1979, *91*, 154269 k).

P. officinarum Cas. ex DC.; see *P. retrofractum* Vahl

P. peepuloides Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 317).

5-Hydroxy-3',4',7-trimethoxyflavone and 5-hydroxy-4',7-dimethoxyflavone isolated (*Planta Med.* 1970, *18*, 332); pipataline, sesamin, piperine and a new amide - N-isobutyldodeca-trans-2,4-dienamide (I), mp. 130° - isolated (*Planta Med.* 1973, *23*, 295); a new piperidine alkaloid isolated and characterised as 2-methoxy-4,5-methylenedioxycinnamoylpiperidine (II) (*Phytochemistry* 1978, *17*, 601).

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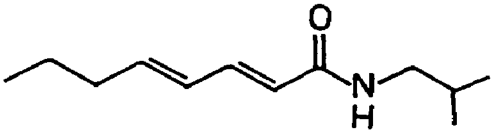
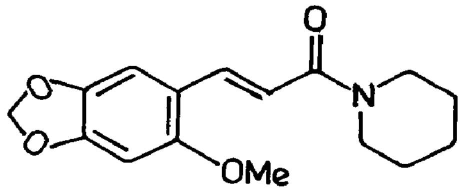


I

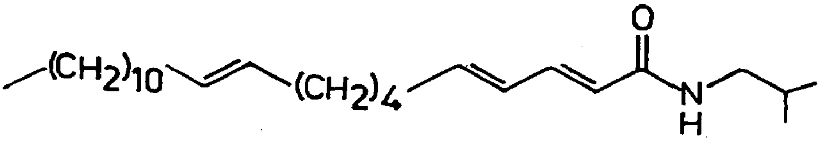


II

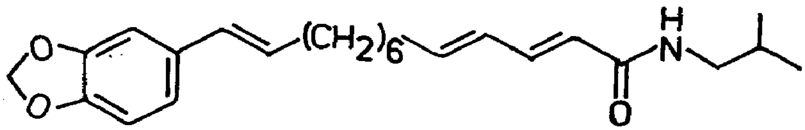
P. retrofractum Vahl syn. *P. chaba* Hunter (non Blume), *P. officinarum* Cas. ex DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 194).

A new amide - N-isobutyltrideca-13(3,4-methylenedioxyphenyl) 2,4,12-trienamide (I) - isolated from fruits (*Phytochemistry* 1976, *15*, 425); filfiline isolated from fruits and characterised as N-isobutyldocosa-trans-2,trans-4,cis-10-trienamide (*Indian J. Chem.* 1976, *14*B, 912); another amide - N-isobutyleicosa-trans-2,trans-4,cis-8-trienamide (II) mp. 67° - isolated from fruits (*Phytochemistry* 1977, *16*, 1436).

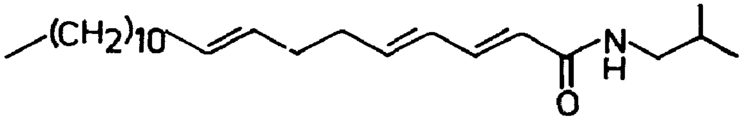
NEW COMPOUNDS



Filfiline



I

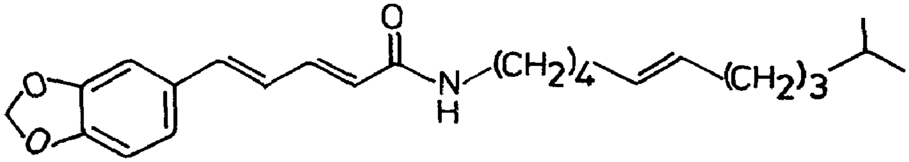


II

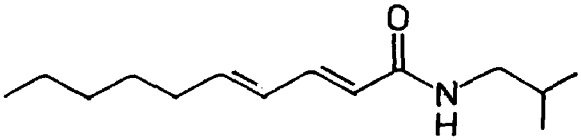
P. sylvaticum Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 194).

A new alkamide - sylvatine - isolated and its structure determined (*Tetrahedron* 1973, *29*, 977); N-isobutyldeca-trans-2, trans-4-dienamide (I) isolated from seeds (*Experientia* 1974, *30*, 223); sesamin, piperine and piperlongumine isolated from roots (*Phytochemistry* 1974, *13*, 2327); (+)diaeudesmin, pipataline, 5-hydroxy-3',4',7-trimethoxyflavone and 5-hydroxy-7-methoxyflavone isolated from seeds (*Indian J. Chem.* 1977, *15*B, 495).

NEW COMPOUNDS



Sylvatine



I

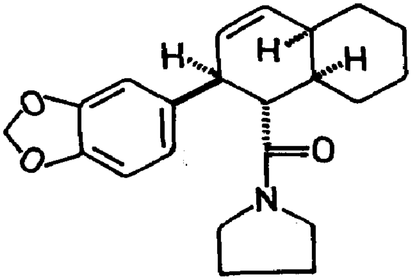
P. trichostachyon (Miq.) DC.

Eng. - Pouched pepper.

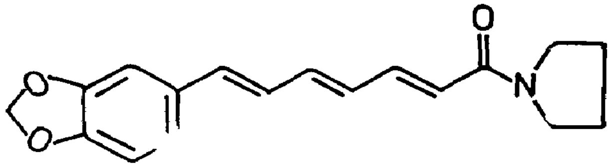
Structure elucidation of trichostachine, mp. 142°, isolated from leaves (*Tetrahedron Lett.* 1969, 4975); trichonine isolated and characterised as N-pyrrolidinyl-eicosa-trans, trans-2,4-dienamide (*Tetrahedron Lett.* 1971, 2119); a higher homologue of trichostachine - 1-piperettylpyrrolidine - isolated from stems (*Phytochemistry* 1974, *13*, 677); isolation and synthesis of cyclostachine A (*Experientia* 1975, *31*, 880); another alkaloid - tricholein - isolated and its structure determined (*Phytochemistry* 1976, *15*, 2018).

Distribution : Western Ghats upto 750 m, Mysore, Kerala and Sivagiri Hills in Tirunelveli district.

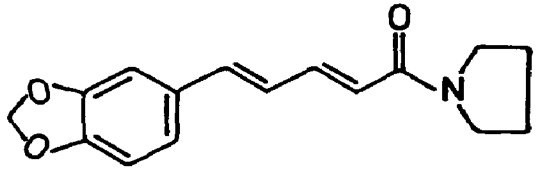
NEW COMPOUNDS



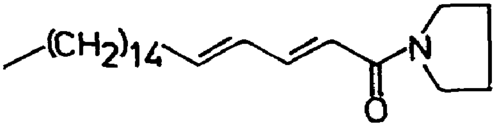
Cyclostachine A



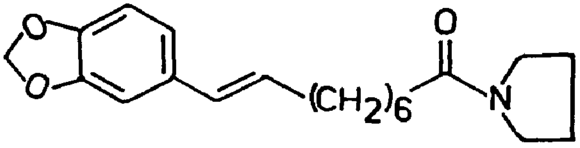
1-Piperettylpyrrolidine



Trichostachine



Trichonine

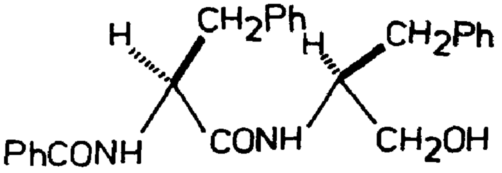


Tricholein

P. wallichii (Miq.) Hand.-Mazz. syn. *P. aurantiacum* Wall. ex Hook.f. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 194).

Piperine, piperettine, sylvatine and β-sitosterol isolated from fruits (*Curr. Sci.* 1974, *43*, 76); a new amide - aurantiamide - and its acetate isolated from seeds (*Indian J. Chem.* 1975, *13*, 1234); stearic and linoleic acids, triacontane, cholesterol, cholestanol and β-sitosterol isolated from fruits (*Indian J. Pharm.* 1976, *38*, 58); friedelin, epifriedelinol, β-sitosterol and an aliphatic alcohol isolated from seeds (*Indian J. Chem.* 1977, *15*B, 395).

NEW COMPOUNDS



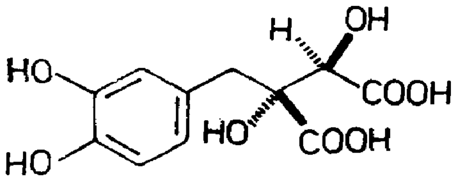
Aurantiamide

PISCIDIA (Papilionaceae)

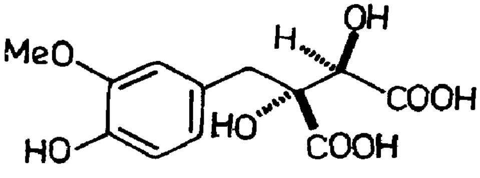
P. erythrina L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 318).

Two phenolic hydroxycarboxylic acids - fukiic acid and 3′-O-methylfukiic acid - isolated from root bark (*Helv. Chim. Acta* 1975, *58*, 974).

NEW COMPOUNDS



Fukiic acid



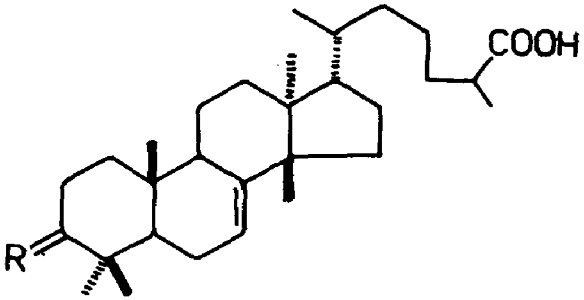
3′-O-Methylfukiic acid

PISTACIA (Anacardiaceae)

P. lentiscus L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 195).

Masticadienonic, dihydromasticadienonic, oleanonic, masticadienolic, dihydromasticadienolic, oleanolic, 3-epimasticadienolic, dihydro-3-epimasticadienolic and 3-epioleanolic acids isolated as methyl esters; β-amyrin, β-amyrone, oleanolic aldehyde, 28-hydroxy-β-amyrone, dammarenediol, erythrodiol and masticadiendiol also isolated from galls (*Phytochemistry* 1973, *12*, 2534).

NEW COMPOUNDS



Dihydromasticadienolic acid
R = H, β-OH
Dihydro-3-epimasticadienolic acid
R = H, α-OH
Dihydromasticadienonic acid
R = O

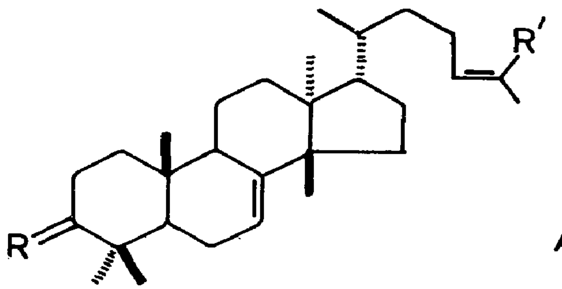
P. terebinthus L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 318).

Out of nine triterpenes isolated from resin of galls, six identified as tirucallol, oleanonic aldehyde, oleanolic aldehyde, dipterocarpol, dammarenediol and 26-hydroxytirucallone (*Phytochemistry* 1973, *12*, 939).

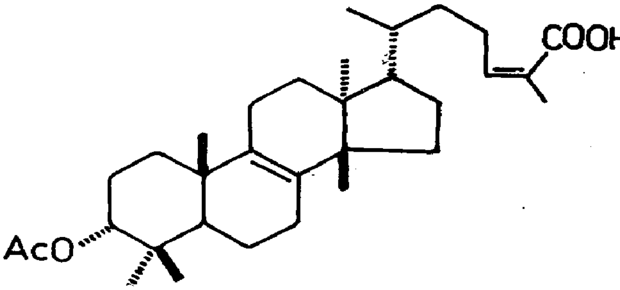
P. vera L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 195).

3-O-Acetyl-3-epimasticadienolic and 3-O-acetyl-3-epiisomasticadienolic acids and masticadienonic aldehyde isolated along with tirucallol, tirucallone, 26-hydroxytirucallone, β-amyrone, oleanolic aldehyde, oleanonic aldehyde, dipterocarpol, dammarenediol and masticadiendiol from oleoresin (*Phytochemistry* 1978, *17*, 815).

NEW COMPOUNDS



3-Epimasticadienolic acid acetate
R = α-OAc,H, R′ = COOH
Masticadienonic aldehyde
R = O, R′ = CHO



3-Epiisomasticadienolic acid acetate

PISTIA (Araceae)

P. stratiotes L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 195).

Vicenin, lucenin, cyanidin-3-glucoside and two unidentified compounds, isolated (*Aquat. Bot.* 1977, *3*, 49; *Chem. Abstr.* 1977, *86*, 167910 j).

PISUM (Papilionaceae)

P. sativum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 319).

D-Galacturonyl-L-rhamnose isolated from hydrolysate of an acidic polysaccharide isolated from seeds (*Agric. Biol. Chem.* 1972, *36*, 1075; *Chem. Abstr.* 1972, *77*, 85545 u); germinating pea seedlings contained high concentration of D-alanine, whereas free alanine in pea seedlings was found to be almost all L-isomer (*Phytochemistry* 1973, *12*, 2593); a cerebroside isolated from seeds which on hydrolysis yielded hydroxytricosanoic acid, sphingosine base and glucose (*Agric. Biol. Chem.* 1974, *38*, 1387; *Chem. Abstr.* 1975, *83*, 93820 u); ferritin isolated from dried pea and its amino acid composition determined (*Biochem. Soc. Trans.* 1977, *5*, 1128; *Chem. Abstr.* 1978, *88*, 3064 b); cis,trans- and trans,trans-xanthoxin found by GLC in roots (*Z. Pflanzenphysiol.* 1978, *86*, 265; *Chem. Abstr.* 1978, *88*, 71478 q).

PITHECELLOBIUM (Mimosaceae)

P. dulce (Roxb.) Benth. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 319).

Saponins showed significant activity against carrageenin-induced oedema and formaldehyde-induced arthritis (*Indian J. Med. Res.* 1970, *58*, 724).

Afzelin and quercitrin isolated (*Shoyakugaku Zasshi* 1977, *31*, 172; *Chem. Abstr.* 1978, *88*, 148947 b)

P. saman (Jacq.) Benth.; see *Samanea saman* (Jacq.) Merr.

PITTOSPORUM (Pittosporaceae)

P. floribundum W. & A. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 196).

Stigmasterol isolated from roots (*Indian J. Chem.* 1977, *15B*, 291).

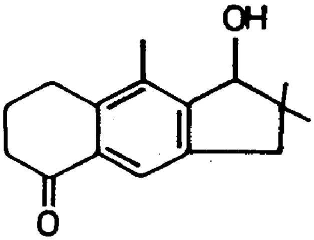
PITYROGRAMMA (Hemionitidaceae)

P. calomelanos (L.) Link syn. *Pteris calomelanos* (L.) Bedd., *Pellaea calomelanos* (L.) Link

Calomelanolactone isolated together with pterosin B; its crystal structure determined (*Phytochemistry* 1978, *17*, 275).

Distribution : Himalayas from Kashmir to Kumaon, alt. 1200-1800 m.

NEW COMPOUNDS



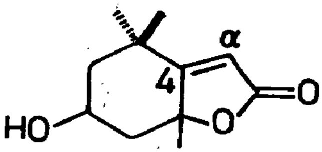
Calomelanolactone

PLANTAGO (Plantaginaceae)

P. lanceolata L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 319).

Apigenin-7-O-glucoside isolated (*Pharmazie* 1976, *31*, 482; *Chem. Abstr.* 1977, *86*, 2345 r); 1,3-dihydroxy-3,5,5-trimethylcyclohex—4α-ene-acetic acid lactone (I) and a caffeic acid glycoside (glucose and rhamnose), mp. 141°, isolated (*Herba Hung.* 1976, *15*, 23; *Chem. Abstr.* 1976, *84*, 176733 q); p-hydroxybenzoic, protocatechuic, gentisic, vanillic, syringic, p-coumaric, caffeic, ferulic and p-hydroxyphenylacetic acids found by PC in leaves; aucuboside and catalpol also present in leaves and seeds (*Herba Pol.* 1977, *23*, 201; *Chem. Abstr.* 1978, *88*, 148981 h).

NEW COMPOUNDS



I

P. major L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 196).

Baicalein, baicalin, scutellarein, luteolin, chlorogenic and neochlorogenic acids isolated (*Khim. Prir. Soedin.* 1971, *7*, 374; *Chem. Abstr.* 1971, *75*, 11586 z; *Farm. Zh.* 1972, *27*, 59; *Chem. Abstr.* 1972, *77*, 2803 c); apigenin, luteolin-7-O-β-D-glucoside and luteolin-7-O-β-D-glucuronide isolated from leaves (*Khim. Prir. Soedin.* 1976, *12*, 812; *Chem. Abstr.* 1977, *86*, 103060 z); aucuboside present in leaves and seeds (*Herba Pol.* 1977, *23*, 201; *Chem. Abstr.* 1978, *88*, 148981 h).

PLATANUS (Platanaceae)

P. orientalis L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 196).

n-Hentriacontane, 16-hentriacontanone, n-hentriacontanol, 12-tricosanol, β-sitosterol stearate, ceryl stearate and amurensin (noricarintin-7-glucoside) isolated from fruits (*Planta Med.* 1976, *29*, 91).

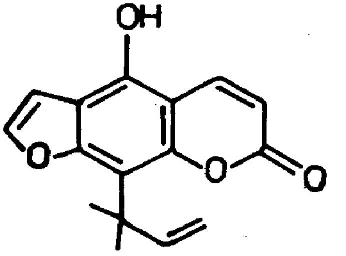
PLATYTAENIA (Apiaceae)

P. lasiocarpa (Boiss.) Rech.f. & Riedl ssp. *thomsonii* (Cl.) Rech.f. & Riedl syn. *Heracleum thomsonii* Clarke

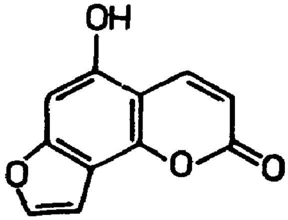
Detection of β-pinene (0.14), p-cymene (1.43), phellandrene (0.70), γ-terpinene (1.59), terpinolene (4.78), γ-cadinene (3.56), α-cadinene (0.98), β-bisabolene (2.0), isolongifolene (17.93), β-elemene (14.34), selinene (0.89), β-caryophyllene (2.43), humulene (3.93) and geranyl acetate (10.03%) by GLC in essential oil of seeds (*Pakistan J. Sci. Ind. Res.* 1978, *21*, 73; *Chem. Abstr.* 1979, *90*, 69122 s); two new coumarins - 5-hydroxy-8-(1',1'-dimethylallyl) psoralen and isobergaptol (5-hydroxy-angelicin) - isolated from roots; 8-geranoxypsoralen, osthol, bergapten, isopimpinellin, spondin, vaginidiol, heraclenol and apterin also isolated (*Indian J. Chem.* 1978, *16*B, 38).

Distribution : North-west Himalayas, alt. 3000-4500 m.

NEW COMPOUNDS



8-(1',1'-Dimethylallyl)psoralen



Isobergaptol

PLECTRANTHUS (Lamiaceae)

P. caninus **Roth; see** ***Coleus caninus*** **(Roth) Vatke**

P. incanus **Link; see** ***P. mollis*** **(Ait.) Spreng.**

P. mollis (Ait.) Spreng. syn. *P. incanus* Link (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 320).

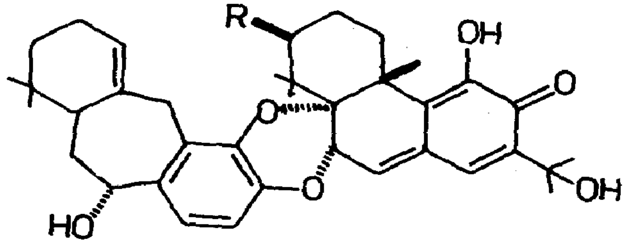
Sitosterol isolated from whole plant (*Indian J. Chem.* 1977, *15*B, 291).

P. nilgherricus Benth.

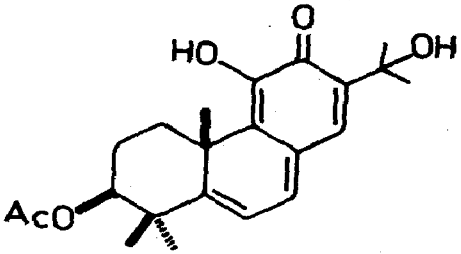
New quinomethanes - 3β-acetoxyfuerstione, nilgherron A and nilgherron B - together with fuerstione isolated from leaf glands and their structures determined; absolute configuration of fuerstione and 3β-acetoxyfuerstione (*Helv. Chim. Acta* 1977, *60*, 2789).

Distribution : Nilgiris and Anamalai Hills.

NEW COMPOUNDS



Nilgherron A
R = H
Nilgherron B
R = OAc



3β-Acetoxyfuerstione

P. rugosus Wall.

Kash. - Solei; P. - Chhichhri, Bui, Piumar; Kumaon - Kurkha.

β-Sitosterol, ursolic acid and oleanolic acid isolated (*Lloydia* 1971, *34*, 265).

Distribution : Western Himalayas from Garhwal to Kashmir, alt. 900-2800 m Bhutan, Mt. Abu (Rajasthan) and Pachmarhi (Madhya Pradesh).

PLECTRONIA (Rubiaceae)

P. didyma Kurz; see *Canthium dicoccum* (Gaertn.) Teijsm & Binn.

PLEIOSPERMIUM (Rutaceae)

P. alatum (Wt. & Arn.) Swingle; see *Naringi alata* (Wall. ex Wt. & Arn.) Ellis

PLEOPELTIS (Polypodiaceae)

P. juglandifolia (D. Don) Moore; see *Arthromeris wallichiana* (Spreng.) Ching

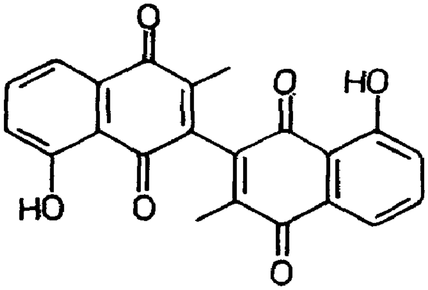
PLUMBAGO (Plumbaginaceae)

P. zeylanica L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 197).

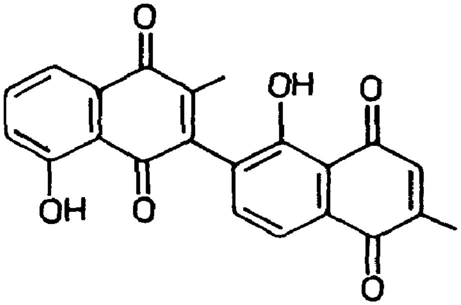
Plant extract (100 mg/kg) prevented 100% ovulation and implantation in female rats (*J. Res. Indian Med.* 1971, *6*, 172).

Plumbagin, 3-chloroplumbagin and a new substance - 3,3'-biplumbagin - isolated from roots (*Tetrahedron Lett.* 1971, 2385; *J. Univ. Poona, Sci. Technol.* No. 44, 1973, 27; *Chem. Abstr.* 1974, *80*, 45670 m; *Phytochemistry* 1976, *15*, 237); a new binaphthaquinone - chitranone - together with zeylinone, isozeylinone, elliptinone and droserone isolated from roots (*Phytochemistry* 1976, *15*, 237).

NEW COMPOUNDS



3,3'-Biplumbagin



Chitranone

PLUMERIA (Apocynaceae)

P. acuminata Ait.; see *P. rubra* L. forma *acuminata* (Ait.) Sant. & Irani ex Shah

P. acutifolia Poir.; see *P. rubra* L. forma *acuminata* (Ait.) Sant. & Irani ex Shah.

P. alba L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 320).

Plumieride isolated from roots, stems and leaves; rutin from leaves (*Bol. Soc. Quim. Peru* 1973, *39*, 89; *Chem. Abstr.* 1974, *80*, 19463 b).

BIOLOGICAL ACTIVITY

Plumieride showed antibacterial activity against gram-positive and gram-negative organisms; it had no cardiotonic effect on isolated guinea pig heart (*Bol. Soc. Quim. Peru* 1973, *39*, 89; *Chem. Abstr.* 1974, *89*, 19463 b).

P. rubra L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 321).

Fulvoplumierin, plumieride, amyrin and lupeol isolated from decorticated stem (*Proc. Nat. Acad. Sci.* India 1976, *46*A, 109; *Chem. Abstr.* 1978, *89*, 103798 h).

P. rubra L. forma *acuminata* (Ait.) Sant. & Irani ex Shah syn. *P. rubra* L. var. *acutifolia* Bailey; *P. acuminata* Ait.; *P. acutifolia* Poir. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 321).

Alcoholic extract was strong relaxant of smooth muscles of isolated rabbit duodenum and isolated guinea pig ileum. It reduced amplitude of contraction of diaphragm musculature in rat phrenic nerve diaphragm preparation. Doses upto 800 mg/kg were non-toxic to mice (*Pakistan J. Sci. Ind. Res.* 1970, *12*, 383; *Chem. Abstr.* 1970, *73*, 75459 x).

L-(+)Bornesitol isolated from leaves (*Phytochemistry* 1971, *10*, 2543).

P. rubra L. var. *acutifolia* Bailey; see *P. rubra* L. forma *acuminata* (Ait.) Sant. & Irani ex Shah

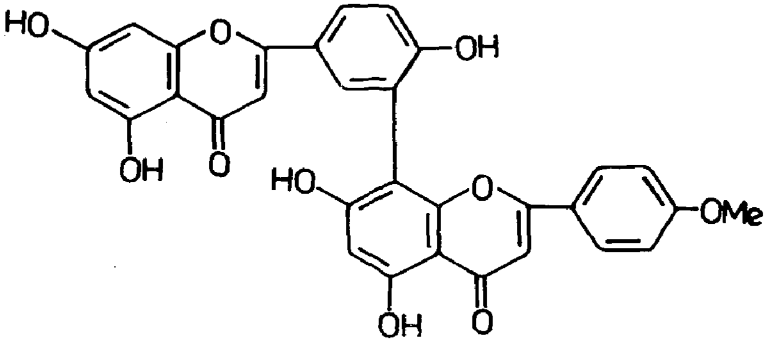
PODOCARPUS (Podocarpaceae)

P. elongatus L'Herit.

Biflavones - amentoflavone, podocarpusflavone A, bilobetin and isoginkgetin - isolated from leaves (*Indian J. Chem.* 1976, *14*B, 727).

Distribution : Native of Africa, introduced into India.

NEW COMPOUNDS



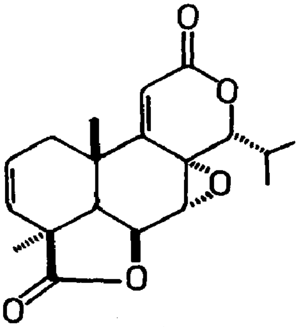
Podocarpusflavone A

P. gracilior Pilger

Amentoflavone, podocarpusflavone A, isoginkgetin and kayaflavone isolated from leaves (*Chem. Ind.* 1970, 28); a new antileukaemic norditerpene dilactone - podolide - isolated (*Experientia* 1975, *31*, 137).

Distribution : Introduced into India.

NEW COMPOUNDS



Podolide

BIOLOGICAL ACTIVITY

Podolide showed tumour-inhibiting activity (*Experientia* 1975, *31*, 137).

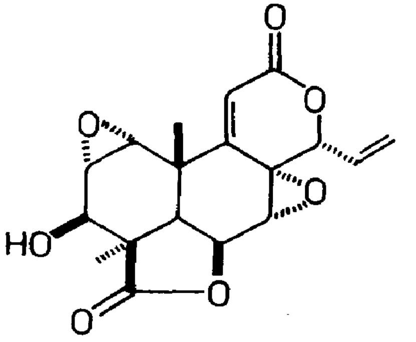
P. neriifolius D. Don syn. *P. polystachyus* R. Br.

Terpene sulphoxides - podolactones C and D - isolated and their structures determined (*Chem. Commun.* 1971, 1362); 7,4′-O-dimethylaromadendrin and its 5-O-glucoside isolated

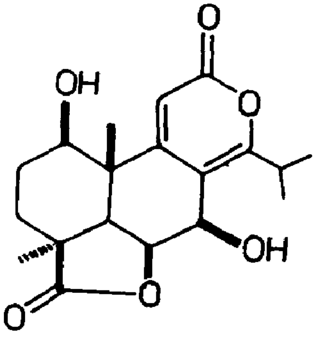
and identified (*Phytochemistry* 1974, *13*, 2879); amentoflavone, podocarpusflavone A, podocarpusflavone B and isoginkgetin isolated (*Phytochemistry* 1974, *13*, 1990); isolation and structure elucidation of hallactone B, inumakilactone B and nagilactone A (*Yao Hsueh Tsa Chih* 1975, *27*, 59; *Chem. Abstr.* 1977, *86*, 121550 p).

Distribution : Himalayas, Nepal and Sikkim alt. 900 m, Khasi Hills and Andaman Islands.

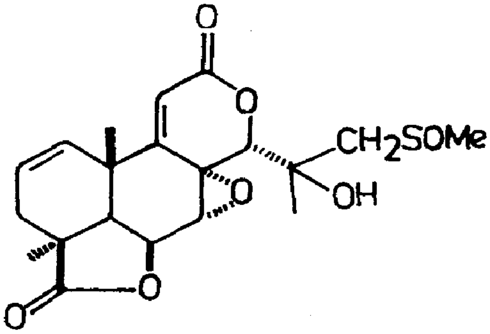
NEW COMPOUNDS



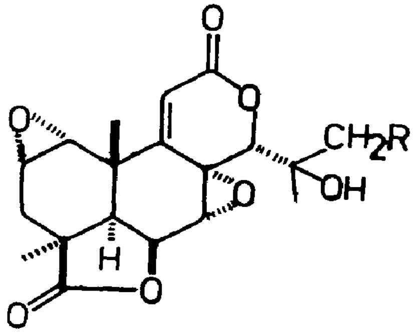
Inumakilactone B



Nagilactone A



Podolactone D



Podolactone C
R = SOMe
Hallactone B
R = SO_2Me

P. polystachyus R. Br.; see *P. neriifolius* D. Don

POECILONEURON (Clusiaceae)

P. indicum Bedd.

Tam. - Puthangkolli; Kan. - Ballagi, Kirballi; Mal. - Vayila; Trade - Ballagi.

Ellagic acid, friedelin, friedelan-3β-ol, hentriacontane, hentriacontanol and ethyl gallate isolated from leaves (*J. Indian Chem. Soc.* 1977, *54*, 999).

Distribution : Western Ghats from North Kanara to Travancore, alt. 300-1200 m.

POGOSTEMON (Lamiaceae)

P. benghalense (Burm.f.) O. Kuntze syn. *P. plectranthoides* Desf. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 322).

β-Pinene (8.0), β-caryophyllene (7.7), safrole (9.1), 1,8-cineole (4.0%), myrtenal, thujone, terpinolene and eudesmol isolated from essential oil of leaves (*Riechst. Aromen, Koerperpflegem.* 1972, *22*, 378-390; *Chem. Abstr.* 1973, *78*, 47638 q).

P. heyneanus Benth. syn. *P. patchouli* Hook.f. (non Pelle.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 322).

Total synthesis of seychellene (*J. Am. Chem. Soc.* 1978, *100*, 5207).

P. patchouli Hook.f.; see *P. heyneanus* Benth.

P. plectranthoides Desf.; see *P. benghalense* (Burm.f.) O. Kuntze

POINCIANA (Caesalpiniaceae)

P. elata L.; see *Delonix elata* (L.) Gamble

P. regia Boj. ex Hook.; see *Delonix regia* (Boj. ex Hook.) Rafin.

P. pulcherrima L.; see *Caesalpinia pulcherrima* (L.) Swartz

POLIANTHES (Amaryllidaceae)

P. tuberosa L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 199).

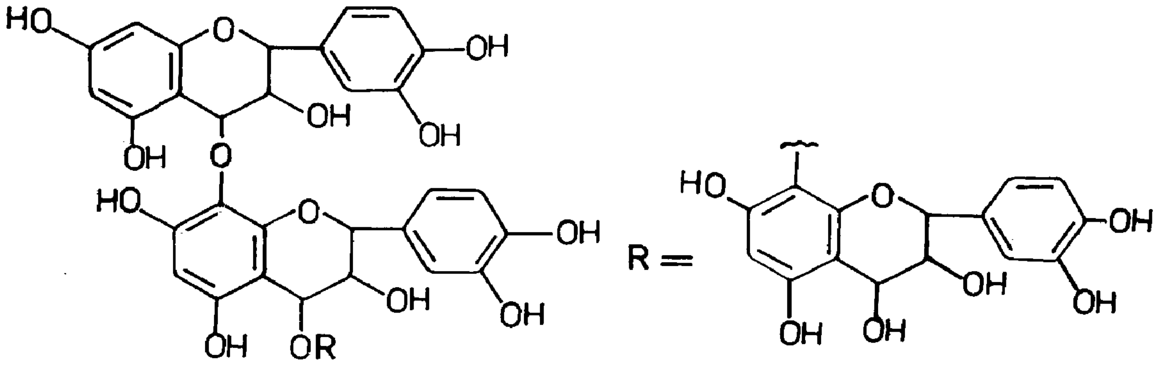
Hecogenin isolated (*Rev. Cubana Farm.* 1973, 7, 125; *Chem. Abstr.* 1975, *83*, 65367 h).

POLYALTHIA (Annonaceae)

P. longifolia (Sonn.) Thw. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 199).

A new proanthocyanidin (I) along with β-sitosterol and leucocyanidin isolated from stem bark; its structure determined as leucocyanidin trimer, 3 units linked together by 4→8, C-O-C linkages and terminal unit having a free cis-diol group (*Curr. Sci.* 1979, *48*, 141).

NEW COMPOUNDS



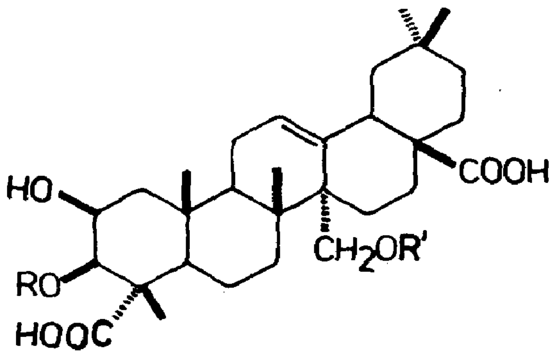
I

POLYGALA (Polygalaceae)

P. arvensis Willd. syn. *P. chinensis* auct. (non L.) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 199).

Lignans - suchilactone, chisulactone and helioxanthin - isolated; suchilactone characterised as 2-piperonylidene-3-veratryl-3S-γ-butyrolactone (*Phytochemistry* 1973, *12*, 2550); two new aryl naphthalide lignans - chinensinaphthol and its methyl ether - isolated and characterised (*Phytochemistry* 1974, *13*, 1933); arctigenin-4′-glucoside (arctiin), kaempferol-3-rhamnoside (afzelin) and myricetin-3-rhamnoside isolated from roots and aerial parts; roots also contained arctigenin-4′-gentiobioside and quercetin-3-rutinoside (rutin) (*Plant Biochem. J.* 1974, *1*, 64; *Chem. Abstr.* 1975, *83*, 190365 g); a new saponin (I) isolated and its structure determined (*Arch. Pharm.* 1975, *308*, 824; *Chem. Abstr.* 1976, *84*, 59929 x).

NEW COMPOUND

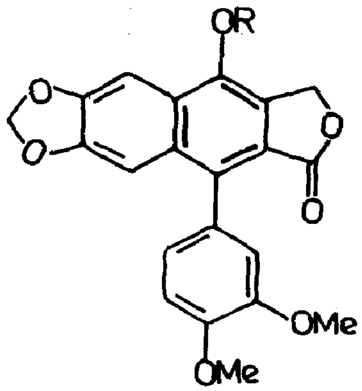


I

R = Rha(4→1)Rha[X](4→1)Ara(4→1)Glu

R′ = Coumaroyl (p-OMe)

X = (2→1)Rha(3→1)Glu



Chinensinaphthol

R = H

Chinensinaphthol methyl ether

R = Me

P. chinensis L.; see *P. arvensis* Willd.

P. erioptera DC.

A saponin isolated which was a derivative of 2β,3β,27-trihydroxy-olean-12-en-23,28-dioic acid (*Bull. Soc. Roy. Sci. Liege* 1972, *41*, 576; *Chem. Abstr.* 1973, *78*, 133397 s).

Distribution : Tropical regions of India.

POLYGONATUM (Liliaceae)

P. multiflorum (L.) Allioni (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 199).

Vitexin xyloside (5,7,4′-trihydroxyflavone-8C-β-D-glucosylxyloside), mp. 202°, and 5,4′-dihydroxyflavone-6C-β-D-glucosylrhamnoside-7-O-glycoside, mp. 194°, isolated (*Diss. Pharm. Pharmacol.* 1969, *21*, 261; *Chem. Abstr.* 1970, *72*, 24544 t); 8C-galactosylapigenin and

6C-galactosyl-8C-arabinosylapigenin isolated from leaves and characterised (*Phytochemistry* 1977, *16*, 1999).

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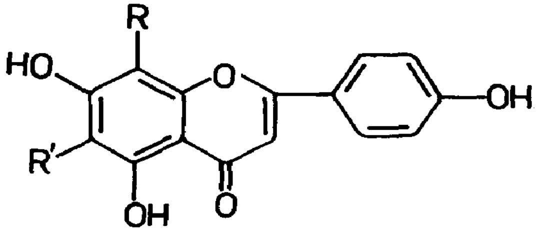

8C-Galactosylapigenin
R = Gal, R′ = H
6C-Galactosyl-8C-arabinosylapigenin
R = Ara, R′ = Gal

POLYGONUM (Polygonaceae)

P. affine D. Don

A new flavonoid - isoaffinetin - along with isovitexin, isoorientin, isovitexin-O-arabinoside and isoorientin-O-arabinoside isolated from leaves (*Z. Pflanzenphysiol.* 1976, *79*, 372; *Chem. Abstr.* 1976, *85*, 156479 d; *Z. Pflanzenphysiol.* 1976, *79*, 465; *Chem. Abstr.* 1976, *85*, 106667 t).

Distribution : Himalayas from Kashmir to Kumaon, alt. 2400-4200 m.

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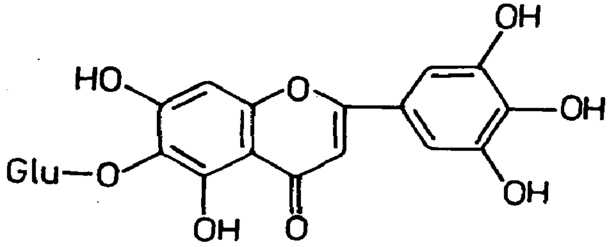

Isoaffinetin

P. amphibium L.

Avicularin, hyperoside, kaempferol, quercimeritrin, quercetin, luteolin-7-glucoside and caffeic and chlorogenic acids isolated (*Khim. Prir. Soedin.* 1970, *6*, 647; *Chem. Abstr.* 1971, *74*, 39175 p; *Farmatsiya* 1972, *21*, 31; *Chem. Abstr.* 1972, *77*, 123815 s).

Distribution : Western Himalayas from Kash nir to Kumaon, alt. 1800-2100 m.

P. aviculare L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 199).

Polysaccharide complex was isolated which consisted mainly of galacturonic acid and arabinose; galactose, glucose, xylose and rhamnose were other sugars of water-soluble polysaccharides (*Khim. Prir. Soedin.* 1978, *14*, 795; *Chem. Abstr.* 1979, *90*, 200274 n).

P. chinense L.; see *P. chinense* L. var. *brachiatum* (Lamk.) Meissn.

P. chinense L. var. *brachiatum* (Lamk.) Meissn. syn. *P. chinense* sensu Hook.f. (non L.) p.p. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 200).

Kaempferol, quercetin, kaempferol-7-O-glucoside, kaempferol-3-O-glucuronide, β-sitosterol and ellagic, gallic, 3-O-methylellagic acids isolated from leaves (*Curr. Sci.* 1977, *46*, 640).

P. convolvulus L.

Eng.- Climbing buckwheat.

Avicularoside, hyperoside, kaempferol, quercitol, quercitoside, rutoside and caffeic, chlorogenic and p-coumaric acids from leaves and flowers (*Riv. Ital. Essenze, Profumi, Piante Offic. Aromi, Saponi, Cosmet, Aerosol* 1975, *57*, 579; *Chem. Abstr.* 1976, *84*, 118437 k).

Distribution : Western and eastern Himalayas, alt. 1500-2500 m.

P. glabrum Willd. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 200).

Cyanidin-3,5-diglucoside, delphinidin-3,5-diglucoside and quercetin isolated from flowers (*Proc. Acad. Sci.* India 1975, *45*A, 309; *Chem. Abstr.* 1977, *87*, 148712 a).

P. hydropiper L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 323).

Petroleum ether extract of roots showed anti-ovulatory activity in rabbits (*Indian J. Med. Res.* 1974, *62*, 1225).

Waxes contained esters of 15 unsaturated, saturated and hydroxylated carboxylic acids (C_{16}-C_{26}) with saturated and unsaturated aliphatic alcohols (C_{26}-C_{34}) and a number of aliphatic hydrocarbons (C_{16}-C_{36}) detected (*Pharmazie* 1970, *25*, 199; *Chem. Abstr.* 1970, *73*, 53008 x).

P. lanigerum R. Br.; see *P. lapathifolium* L. var. *lanatum* (Roxb.) Steward

P. lapathifolium L. var. *lanatum* (Roxb.) Steward syn. *P. lanigerum* R. Br.

Chrysophanol, quercetin, kaempferol and quercitrin isolated (*Vijnana Parishad Anusandhan Patrika* 1978, *21*, 179; *Chem. Abstr.* 1979, *90*, 164748 j).

Distribution : West Bengal, Rohilkhand and foothills of Himalayas from Punjab to Sikkim.

P. persicaria L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1956, p. 324).

5,7-Dihydroxychromone and quercetin-3-galactoside isolated from seeds (*Phytochemistry* 1974, *13*, 2890).

P. plebeium R. Br. (*plebejum*) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 200).

Oleanolic and betulinic acids, epi-friedelinol and β-sitosterol from flowers (*Planta Med.* 1976, *30*, 133); quercetin-3-arabinoside and quercetin-3-rutinoside isolated from flowers (*Proc. Nat. Acad. Sci.* India 1977, *47*A, 70; *Chem. Abstr.* 1978, *89*, 193830 q).

P. pulchrum Blume syn. *P. tomentosum* Willd.

Quercetin, rhamnetin, quercitrin and rutin isolated; bikhaconitine, glucose and rhamnose isolated from roots (*J. Indian Chem. Soc.* 1977, *54*, 927); pelargonidin-3-glucoside from flowers (*Vijnana Parishad Anusandhan Patrika* 1978, *21*, 177; *Chem. Abstr.* 1979, *90*, 183171 g).

Distribution : West Bengal, Orissa, coastal areas of peninsular India and Andaman Islands.

P. recumbens Royle

A new flavonoid glucoside - vogelin - isolated as pentaacetate (*Chem. Ber.* 1971, *104*, 3425); β-sitosterol and its glucoside isolated (*Phytochemistry* 1971, *10*, 2829).

Distribution : Western Himalayas from Kashmir to Kumaon, alt. 1300-2400 m.

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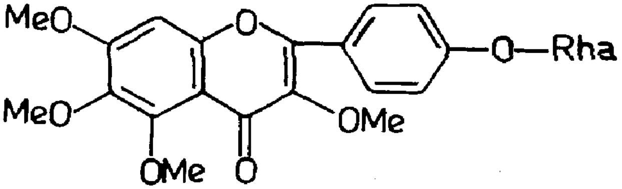

Vogelin

P. tomentosum Willd.; see *P. pulchrum* Blume

POLYPODIUM (Polypodiaceae)

P. amoenum Wall. ex Mett; see *Goniophlebium amoenum* (Wall. ex Mett) J. Sm.

P. juglandifolium D. Don; see *Arthromeris wallichiana* (Spreng.) Ching

P. vulgare L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 324).

Pollinastanol from leaves and rhizomes (*C. R. Acad. Sci.* Ser. D 1969, *269*, 2033; *Chem. Abstr.* 1970, *72*, 75627 e; *C. R. Acad. Sci.* Ser. D 1970, *271*, 862; *Chem. Abstr.* 1971, *74*, 10316 z); cycloartanol, cyclolaudenol, 31-norcycloartanol, 7-dehydrocholestenol, lophenol, 24-methylenelophenol, citrostadienol, fucosterol (or isofucosterol) and β-sitosterol isolated (*C. R. Acad. Sci.* Ser. D 1970, *271*, 862; *Chem. Abstr.* 1971, *74*, 10316 z); polydin isolated and its structure elucidated as (+)catechol-7-L-arabinoside (*Ann. Chem.* 1970, *734*, 46); osladine isolated from aerial parts (*Sci. Pharm.* 1978, *46*, 281; *Chem. Abstr.* 1979, *90*, 142101 r).

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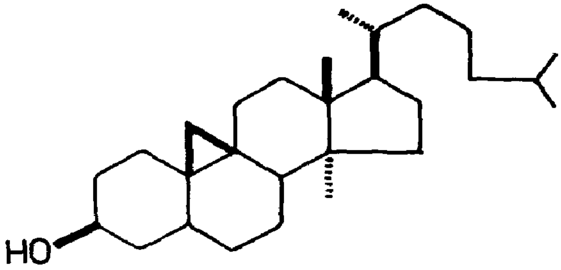
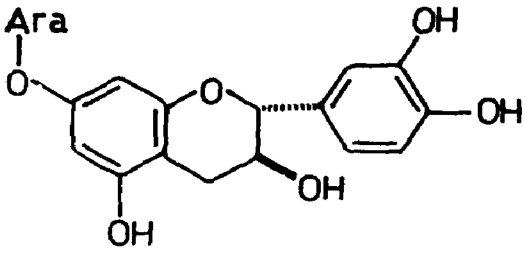


Pollinastanol



Polydin

POLYPORUS (Polyporaceae)

P. porrectus Murr.

Compound A, compound B, mp. 54°, compound C, mp. 100°, and compound D, mp. 102°, isolated; structure of compound A assigned as 1,4-dimethoxy-2,3,5,6-tetrachlorobenzene (*Indian J. Chem.* 1976, *14*B, 230).

PONCIRUS (Rutaceae)

P. trifoliata (L.) Rafin. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, 325).

Limonin and marmesin isolated from wood (*Shoyakugaku Zasshi* 1970, *24*, 122; *Chem. Abstr.* 1971, *75*, 1273 b); imperatorin and heraclenin from seeds and stems (*Phytochemistry* 1972, *11*, 1530); synthesis of poncitrin (*Indian J. Chem.* 1973, *11*, 983); structure determination of poncitrin (*Tetrahedron* 1974, *30*, 939); aurapten and its 6-methoxy derivative from seeds (*Z. Naturforsch.* 1974, *29C*, 201; *Chem. Abstr.* 1974, *81*, 74852 y); new coumarins - poncimarin and isoponcimarin - isolated and their structures elucidated (*Phytochemistry* 1976, *15*, 348; *ibid.* 1977, *16*, 1257); in addition to 7-geranyloxycoumarin, 6-methoxy-7-geranyloxycoumarin, bergapten and imperatorin isolated from fruits (*Phytochemistry* 1977, *16*, 1257).

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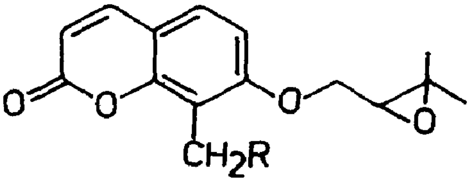
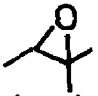
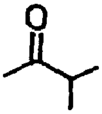


Poncimarin

R = 

Isoponcimarin

R = 

PONGAMIA (Papilionaceae)

P. glabra Vent.; see *Derris indica* (Lamk.) Bennet

P. pinnata (L.) Pierre; see *Derris indica* (Lamk.) Bennet

POPULUS (Salicaceae)

P. alba L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 201).

7-O-Methylaromadendrin isolated (*Phytochemistry* 1971, *10*, 1972).

P. nigra L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 325).

3-O-Methylkaempferol, 3-O-methylgalangin, chrysin, galangin, pinocembrin, izalpinin and pinostrobin isolated from buds (*Phytochemistry* 1969, *8*, 2425); (+)isolariciresinol-β-D-monoglucopyranoside, mp. 137°, together with salicin, salicortin, nigracin and caffeic acid-3-glucoside isolated from leaves (*Pharmazie* 1969, *24*, 567; *Chem. Abstr.* 1970, *72*, 21908 d); apigenin, genkwanin, quercetin, rhamnetin, isorhamnetin, rhamnazin, kaempferol and pinostrobin isolated from buds (*Phytochemistry* 1971, *10*, 225); structure of a flavanone isolated from buds revised to 2,5-dihydroxy-7-methoxyflavanone (I) and confirmed by synthesis (*Bull. Soc. Chim. Fr.* 1973, 1781).

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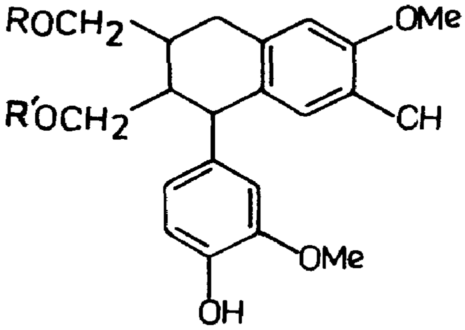

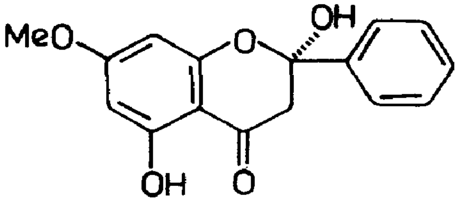

(+)Isolariciresinol-β-D-monoglucoside I

R/R′ = H/Glu

P. nigra L. var. *italica* (Moench.) Koehne syn *P. nigra* L. var. *pyramidalis* Spach

Eng. - Lombardy poplar; H. - Fras, Farsh, Sufeda.

Rhamnetin and rhamnocitrin isolated from cortex (*Himeji Kogyo Daigaku Kenkyu Kokoku* 1977, *30*A, 19; *Chem. Abstr.* 1978, *89*, 3199 v); C_{15-35} alkanes determined by GC in bark, leaves and needles (*Collect. Czech. Chem. Commun.* 1978, *43*, 320).

Distribution : North-western Himalayas, alt. 900-3700 m.

P. nigra L. var. *pyramidalis* Spach; see *P. nigra* L. var. *italica* (Moench.) Koehne

P. robusta Schneid.

A new cytokinin (I) isolated from leaves and characterised as 6-[(o-hydroxybenzyl)amino]-9-β-D-ribofuranosylpurine (*Tetrahedron Lett.* 1973, 2827).

Distribution : Introduced from U. K., under trial cultivation in Almora and Chakrata Hills in Uttar Pradesh.

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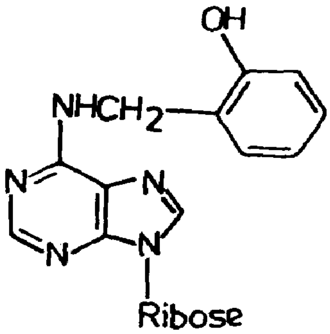


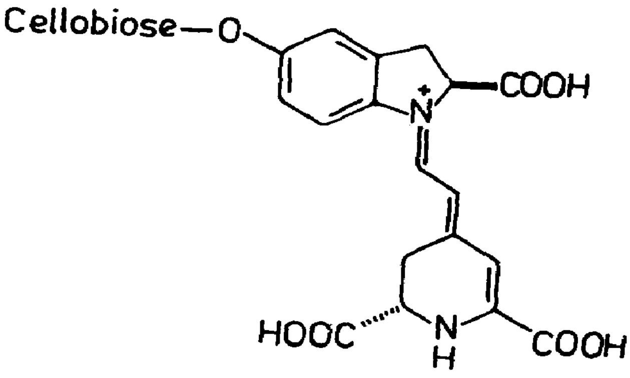
I

PORTULACA (Portulacaceae)

P. oleraceae L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 326).

Oleracins I and II (5-O-β-cellobiosides of betanidin and isobetanidin respectively) and acylated betacyanins isolated (*Phytochemistry* 1975, *14*, 2091); mucilage (0.42%) from leaves; its acidic fraction consisted of galacturonic acid residues joined by α-(1→4)-linkages and neutral fraction composed of arabinose (4→1) and galactose (43%), with traces of rhamnose (*Carbohydr. Res.* 1977, *56*, 123; *Chem. Abstr.* 1977, *87*, 35876 p).

NEW COMPOUNDS



Oleracin I

POTAMOGETON (Potamogetonaceae)

P. natans L.

Isoscoparin, mp. 206°, isolated from leaves and characterised as 6C-*β*-D-glucopyranosylchrysoeriol (*C. R. Acad. Sci.* Ser. D 1972, *274*, 1099; *Chem. Abstr.* 1972, *77*, 16565 p).

Distribution : Kashmir, alt. 1500 m.

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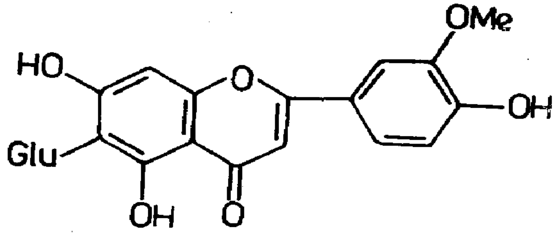

Isoscoparin

PRANGOS (Apiaceae)

P. pabularia Lindl. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 326).

Osthol, merancin, its hydrate, psoralen, xanthotoxol, xanthotoxin, imperatorin and prangenin isolated from roots, leaves and fruits (*Rastit. Resur.* 1970, *6*, 534; *Chem. Abstr.* 1971, *74*, 95412 a); a new furocoumarin - pabularinone - along with imperatorin and isooxypeucedanin isolated from roots (*Chem. Ind.* 1970, 746; *Tetrahedron* 1972, *28*, 5175); pabulenol isolated (*Tetrahedron* 1972, *28*, 5175); imperatorin, isoimperatorin, osthol, suberosin, bergapten, **xanthotoxin**, isopimpinellin, oxypeucedanin, oxypeucedanin hydrate, heraclenol and 8-(3-chloro-2-hydroxy-3-methylbutanoxy)psoralen (I) isolated from umbels (*J. Indian Chem. Soc.* 1978, *55*, 850).

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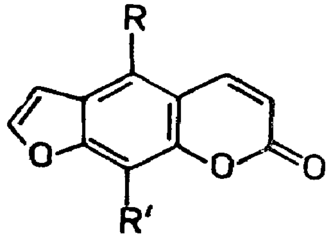
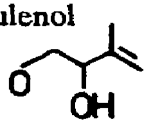
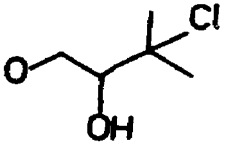


Pabulenol

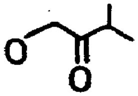
R = 

, R' = H

I

R = H, R' = 

Pabularinone

R = H, R' = 

PREMNA (Verbenaceae)

P. corymbosa Rottl. & Willd.; see *P. integrifolia* L.

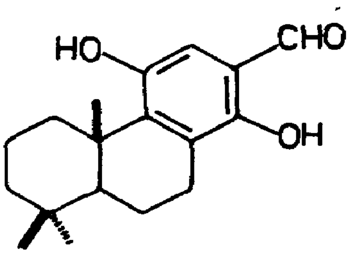
P. integrifolia L. syn. *P. corymbosa* sensu Hook.f. (non Rottl. & Willd)., *P. obtusifolia* R. Br. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 327).

β-Sitosterol isolated from leaves and stem bark; betulin isolated from stem bark (*J. Indian Chem. Soc.* 1978, *55*, 102).

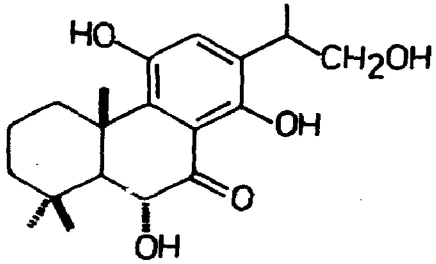
P. latifolia Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 203).

A new aromatic bisnorditerpene - premnolal - isolated and its structure determined (*Curr. Sci.* 1978, *47*, 498); novel diterpenes - nellionol, anhydronellionol and 5-dehydronellionol - isolated from root bark (*Curr. Sci.* 1978, *47*, 455); four new hydroxy sandaracopimar-15-enes I,II,III and IV isolated from bark and their structures elucidated (*Curr. Sci.* 1978, *47*, 577).

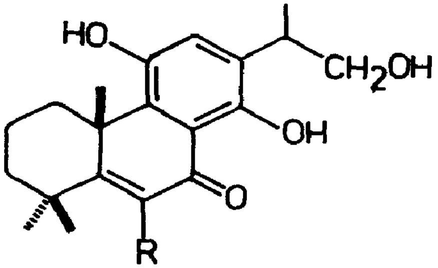
NEW COMPOUNDS



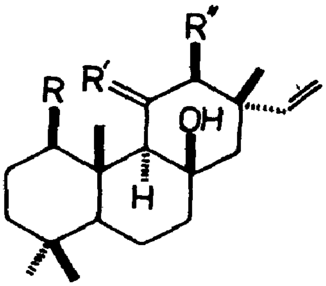
Premnolal



Nellionol



Anhydronellionol
R = H
5-Dehydronellionol
R = OH



	R	R'	R''
I	H	H,H	H
II	H	O	H
III	OH	H,H	H
IV	OH	H,H	OH

P. obtusifolia R. Br. see *P. integrifolia* L.

PROSOPIS (Mimosaceae)

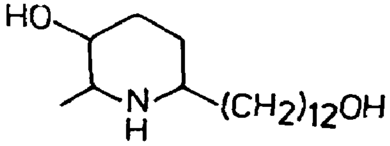
P. chilensis (Molana) Stuntze syn. *P. juliflora* (Swartz) DC.

H. - Vilayti kikkar, Kabuli kikkar, Vilayti babul, Vilayti khejra.

A flavonoid - patulitrin - along with glucose and sucrose isolated from pods (*Qual. Plant Mater. Veg.* 1972, *22*, 119; *Chem. Abstr.* 1973, *78*, 108233 c); three new alkaloids - juliflorine, julifloricine and julifloridine - isolated; structure of julifloridine proposed (*Z. Naturforsch.* 1978, *33*B, 347; *Chem. Abstr.* 1978, *89*, 20279 p).

Distribution : Indigenous to West Indies and Mexico, introduced and naturalised in drier parts of India.

NEW COMPOUNDS



Julifloridine

P. cineraria (L.) Druce syn. *P. spicigera* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 328).

A new alkaloid - spicigerine - isolated and characterised as ω-(3-hydroxy-2-methyl-6-piperidyl)alkanoic acid (*Pahlavi Med. J.* 1974, *5*, 1; *Chem. Abstr.* 1974, *81*, 23097 y); fixed oil (4.5%) from seeds, fatty acid composition determined as palmitic (17.18), stearic (1.85), oleic (39.32) and linoleic (41.65%) acids by GLC; β-sitosterol isolated and galactose, mannose, glucose, arabinose and rhamnose identified by PC in seeds (*Proc. Nat. Acad. Sci.* India 1976, *46*A, 36; *Chem. Abstr.* 1978, *89*, 143328 m); a new flavone - prosogerin C - from seeds characterised as 6,7,3',4',5'-pentamethoxyflavone (*Indian J. Chem.* 1978, *16*B, 1133); prosogerins A and B isolated from flowers and their structures determined (*Phytochemistry* 1979, *18*, 355).

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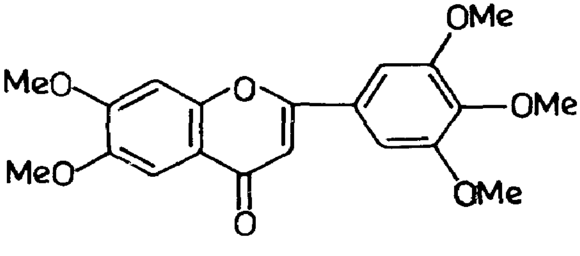
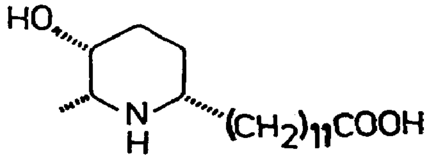
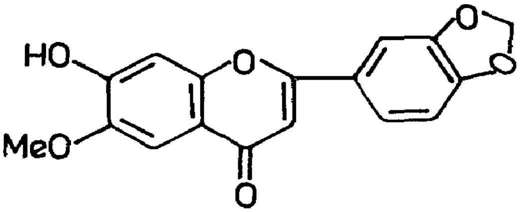


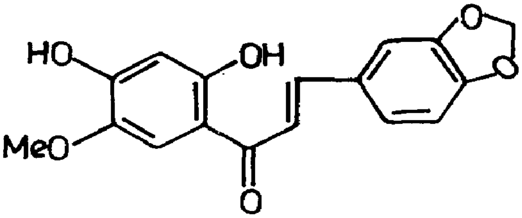
Prosogerin C



Spicigerine



Prosogerin A



Prosogerin B

P. glandulosa Torr. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 328).

Prosopanol G, mp. 235° and an unidentified indole type alkaloid, mp. 240°, isolated from seeds (*Pakistan J. Sci. Ind. Res.* 1972, *15*, 159; *Chem. Abstr.* 1973, *78*, 121271 h); oleanolic and ursolic acids and glycosides of campesterol, stigmasterol and β-sitosterol and D(+)pinitol isolated from stems (*Planta Med.* 1977, *32*, 244).

P. juliflora (Swartz) DC.; see *P. chilensis* (Molana) Stuntze

P. spicigera L.; see *P. cineraria* (L.) Druce

PRUNUS (Rosaceae)

P. acuminatum Coleb.; see *P. ceylanica* (Wt.) Miq.

P. amygdalus Batsch; see *P. dulcis* (Mill.) D. A. Webb.

P. armeniaca L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 328).

24-Dehydrocholesterol, cholesterol, estrone and α-estradiol (estradiol-β-17-ol) isolated from seeds (*Phytochemistry* 1974, *13*, 678); seed kernels contained myristic, palmitic, stearic, oleic and linoleic acids and β-sitosterol (*Bull. Fac. Pharm. Cairo Univ.* 1974, *13*, 175; *Chem. Abstr.* 1977, *86*, 40213 d).

P. avium L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 328).

Prunasin (D-mandelonitrile-β-glucoside) isolated from stems and fruits (*Phytochemistry* 1970, *9*, 2085; *ibid.* 1972, *11*, 3121); dihydrowogonin, jaceidin and 6-methoxykaempferol isolated from buds (*Z. Naturforsch.* 1972, *27B*, 567; *Chem. Abstr.* 1972, *77*, 85586 h); mandelonitrile-β-D-gentiobioside isolated from flowers (*Phytochemistry* 1972, *11*, 3121).

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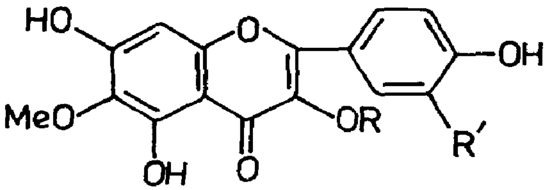

Jaceidin
R = Me, R′ = OMe
6-Methoxykaempferol
R,R′ = H

P. avium L. var. *juliana* (L.) Schubler & Martens

Eng. - Heart cherry, Gean cherry.

6-Methoxykaempferol isolated (*C. R. Acad. Sci.* Ser. C 1971, *272*, 1529; *Chem. Abstr.* 1971, 75, 35612 b).

Distribution : Cultivated in Kashmir, Himachal Pradesh and Uttar Pradesh hills, alt. 1500-2000 m.

P. cerasus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 329).

A flavanone - cerasinone - and two chalcones - cerasidin and cerasin - isolated and their structures elucidated (*Phytochemistry* 1977, *16*, 1317); chrysin, tectochrysin, dihydrotectochrysin, dihydrowogonin, pinocembrin, sakuranetin, naringenin, aromadendrin, taxifolin, kaempferol and quercetin isolated from heartwood (*Planta Med.* 1977, *32*, 50); synthesis of cerasin, cerasinone and cerasidin (*Indian J. Chem.* 1978, *16*B, 439).

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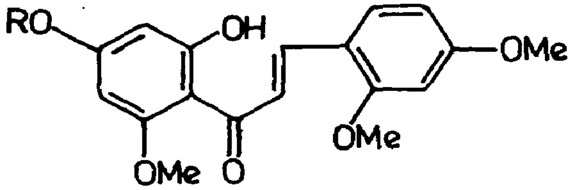
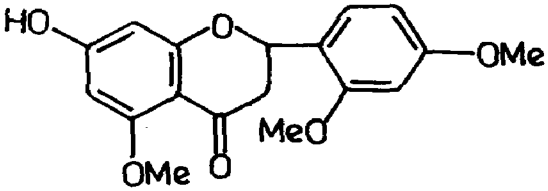


Cerasidin
R = Me
Cerasin
R = H



Cerasinone

P. ceylanica (Wt.) Miq. syn. *Pygeum gardneri* Hook.f., *P. wightianum* Bl. ex C. Muell., *P. wightianum* Bl. ex C. Muell. var. *parvifolium* Thw. ex Hook.f., *P. glaberrimum* Hook.f., *P. acuminatum* Coleb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 208).

Acuminatic acid, friedelin, epifriedelinol, lupeol, betulinic acid, ursolic acid, 2α-hydroxyursolic acid, 2α,3α-dihydroxyurs-12-en-28-oic acid and β-sitosterol and its glucoside isolated; structure of acuminatic acid elucidated as 2α,3α,19α-trihydroxyurs-12-ene-28-oic acid (*Indian J. Chem.* 1977, *15*B, 914).

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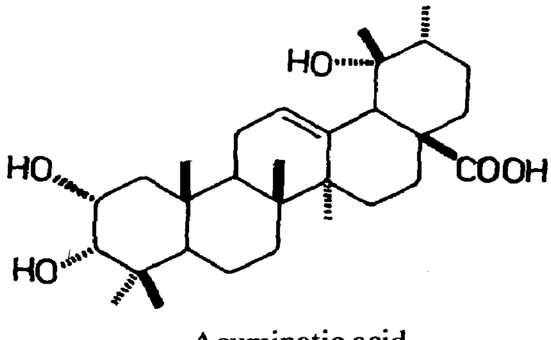

Acuminatic acid

P. communis Huds. see *P. domestica* L.

P. domestica L. syn. *P. communis* Huds. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 329).

Pinocembrin, isosakuranetin, chrysin, naringenin and quercetin isolated from heartwood (*Planta Med.* 1977, *31*, 146); phloracetophenone, 4-O-methylphloracetophenone and its 6-O-glucoside (I) and fraxinol isolated from bark (*Phytochemistry* 1977, *16*, 614).

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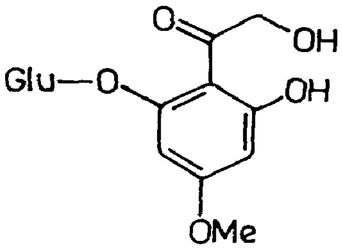

I

P. dulcis (Mill.) D. A. Webb. syn. *P. amygdalus* Batsch, *Amygdalus communis* L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 204).

Prunasin, daucosterin and sitosterol isolated from bitter seeds whereas sweet almonds contained daucosterin and sitosterol only (*Phytochemistry* 1972, *11*, 2358).

P. glaberrimum Hook.f.; see *P. ceylanica* (Wt.) Miq.

P. persica (L.) Batsch (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 331).

Hentriacontane, hentriacontanol, β-sitosterol and ursolic acid isolated from leaves (*J. Indian Chem. Soc.* 1969, *46*, 755); multinoside A, kaempferol-3-rhamnoside, quercitrin, multiflorins A and B and chlorogenic acid isolated from flowers (*Yakugaku Zasshi* 1977, *97*, 109; *Chem. Abstr.* 1977, *86*, 136329 x); detection of γ-hexalactone, γ-octalactone, δ-octalactone, γ-nonalactone, γ-decalactone, δ-decalactone, γ-dodecalactone and δ-dodecalactone by GLC in essential oil (*An. Bromatol.* 1978, *30*, 235; *Chem. Abstr.* 1979, *91*, 44393 p); cyanidin-3-glucoside and peonidin glycosides identified in petals by PC (*Kenkyu Nempo-Nihon Daigaku Burnigakubu* (*Mishima*), *Shizen Kagaku Hen* 1978, *27*, 17; *Chem. Abstr.* 1979, *91*, 2548 n).

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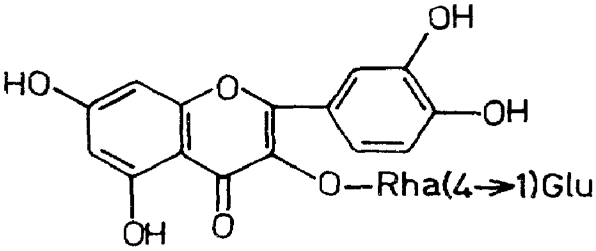

Multinoside A

P. tomentosa Thunb.

A new coumarin glucoside - tomenin - isolated; structure of another coumarin determined as 7-(3′-methyl-2′,3′-epoxybutyloxy)- 5,6-methylenedioxycoumarin (I) (*Indian J. Chem.* 1978, *16*B, 591).

Distribution : North-western Himalayas, Kashmir and Ladakh, alt. 1500-1800 m.

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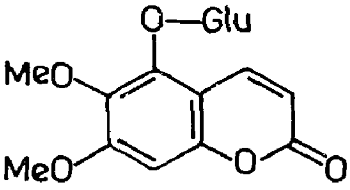
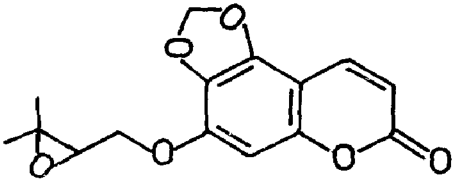


Tomenin



I

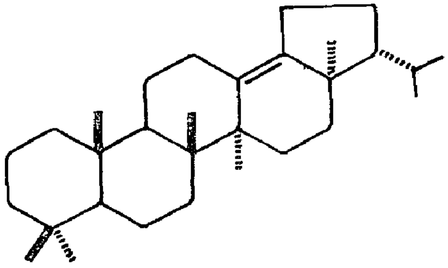
PSEUDODRYNARIA (Polypodiaceae)

P. coronans (Wall. ex Mett.) Ching syn. *Drynaria coronans* J. Sm.

Neohop-13(18)-ene isolated (*Shoyakugaku Zasshi* 1978, *32*, 260; *Chem. Abstr.* 1979, *91*, 96562 n).

Distribution : Throughout India

NEW COMPOUNDS



Neohop-13(18)ene

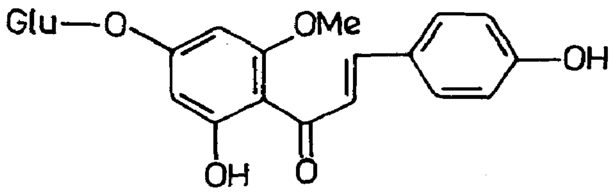
PSEUDOGNAPHALIUM (Asteraceae)

P. luteo-album (L.) Hillard & Burtt ssp. *affine* (D. Don) Hillard & Burtt syn. *Gnaphalium luteo-album* L. var. *multiceps* (Wall. ex DC.) Hook.f., *G. affine* D. Don *G. multiceps* Wall. ex DC.

A new chalcone glucoside (I), mp. 199°, isolated and characterised as 2′,4,4′-trihydroxy-6′-methoxychalcone-4′-glucoside (*Phytochemistry* 1974, *13*, 286; *Chem. Pharm. Bull.* 1974, *22*, 1800); luteolin and its 4′-D-glucoside isolated from flowers (*Chem. Pharm. Bull.* 1974, *22*, 1800).

Distribution : Foothills of Himalayas and Meghalaya, ascending to 2500 m.

NEW COMPOUND



I

PSIDIUM (Myrtaceae)

P. guajava L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 331).

A saponin containing oleanolic acid isolated from fruit (*Indian J. Appl. Chem.* 1971, *34*, 214; *Chem. Abstr.* 1972, *77*, 85583 e); gibberellins A_1, A_3, A_4, A_5, A_6 and A_7 isolated from immature seeds (*J. Exp. Bot.* 1973, *24*, 418; *Chem. Abstr.* 1973, *79*, 2763 f); leaf essential oil (0.5%) contained myrcene (0.99), dl-limonene (8.01), caryophyllene (7.7), caryophyllene oxide (37.5), eugenol (13.0) and 1,8-cineole (2.7%) (*Reichst., Aromen, Koerperpflegem* 1976, *26*, 156; *Chem. Abstr.* 1977, *86*, 60390 h); α-pinene, β-pinene, limonene, menthol, α-terpenyl acetate and isopropyl alcohol isolated by GLC from volatile oil of leaves; a mixture of glycosides isolated which on acidic hydrolysis yielded maslinic acid, 2α-hydroxyursolic acid and β-sitosterol (*Egypt. J. Chem.* 1975, *18*, 347; *Chem. Abstr.* 1977, *87*, 141108 z); leaf essential oil of Philippinese plant contained α-pinene (24.0), limonene (35.0), longicyclene (7.0), caryophyllene (12.0), β-bisabolene (18.0) and caryophyllene oxide (4.0%) (*Asian J. Pharm.* 1977, *3*, 5; *Chem. Abstr.* 1978, *89*, 48787 d); detection of β-pinene (<0.5), limonene (0.5), β-copaene (1.0), β-caryophyllene (95.0), farnesene (<0.5), α- and β-humulene (0.5), β-bisabolene (1.0), α- and β-selinene (1.0), cadinene (<0.5) and curcumene (<0.5%) by GLC (*Phytochemistry* 1978, *17*, 1435).

PSOPHOCARPUS (Papilionaceae)

P. tetragonolobus (L.) DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 332).

Pterocarpans induced by inoculation of *Botrytis cinera* or $CuCl_2$ solution in immature pods identified as phaseollidin, 9-hydroxy-3-methoxypterocarpan and 1-methoxy-3,9-dihydroxy-10-isopentenylpterocarpan (I) (*Phytochemistry* 1977, *16*, 2044).

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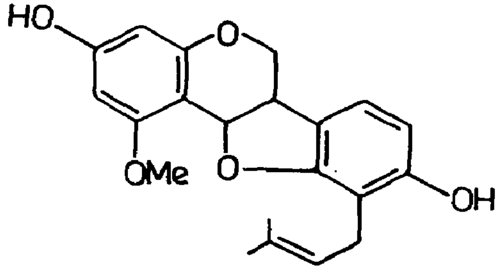


I

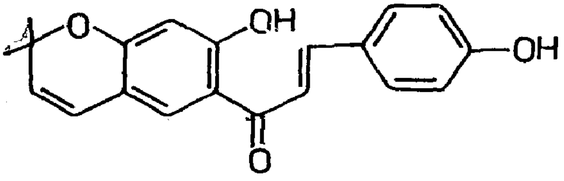
PSORALEA (Papilionaceae)

P. corylifolia L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 332).

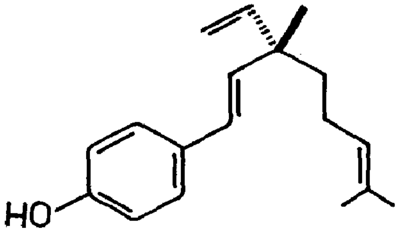
Extract of seeds containing psoralen and angelicin showed skin photosensitising activity in guinea pigs (*Planta Med.* 1977, *31*, 151).

Isolation and separation of psoralone and isopsoralone from seeds (Ger. 1,900,435 (1970) July 9; *Chem. Abstr.* 1970, *73*, 69843 b); isolation and separation of psoralen and isopsoralen from seeds (US 355,236 (1971) Jan. 5; *Chem. Abstr.* 1971, *74*, 67614 z); a new isoflavone - neobavaisoflavone - and a new chromenochalcone - bavachromene - isolated from seeds and fruits (*Curr. Sci.* 1972, *41*, 814, 882; *Indian J. Chem.* 1974, *12*, 15); bavachin, psoralidin, 4'-O-methylbavachalcone, 7-O-methylbavachin and isobavachalcone isolated from seeds (*Curr. Sci.* 1972, *41*, 814; *Phytochemistry* 1977, *16*, 1995); a novel monoterpene phenol - (+)bakuchiol - from seeds; its structure and absolute configuration [(S)-chirality] assigned (*Tetrahedron* 1973, *29*, 1119, 1127); a new isoflavone - corylin - isolated and characterised as 7-hydroxy-6'',6''-dimethylpyrano(2'',3''·4',3') isoflavone; partial synthesis of corylin (*Indian J. Chem.* 1974, *12*, 659); high yield of psoralen and angelicin found in seeds (*Planta Med.* 1977, *31*, 151); new coumestrol - corylidin - isolated from seeds together with triacontane and β-sitosterol-β-D-glucoside (*Phytochemistry* 1977, *16*, 403); new formylated chalcone - neobavachalcone - isolated from seeds and its synthesis (*Phytochemistry* 1977, *16*, 1995); a new isoflavone - corylinal - isolated from seeds together with neobavaisoflavone as their methyl ethers (*Phytochemistry* 1978, *17*, 164); isolation and structure elucidation of another isoflavone - psoralenol - from seeds (*Phytochemistry* 1978, *17*, 2046).

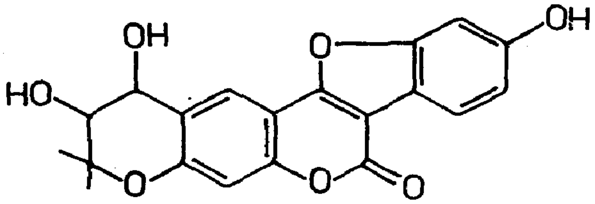
NEW COMPOUNDS



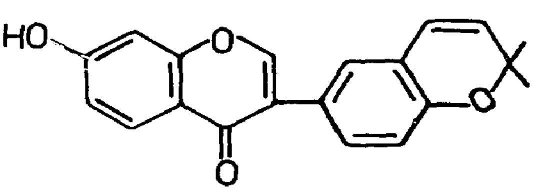
Bavachromene



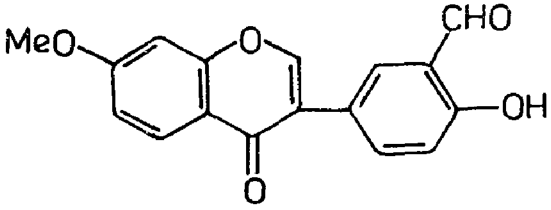
Bakuchiol



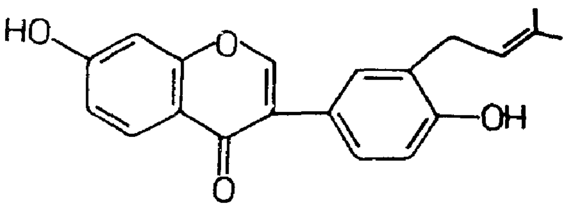
Corylidin



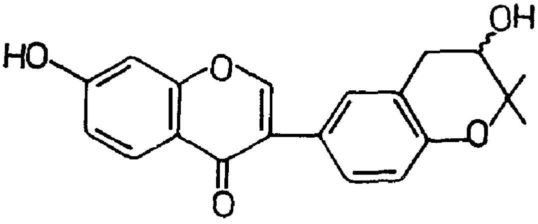
Corylin



Corylinal



Neobavaisoflavone



Psoralenol

P. plicata Delile

P. - Bakhtmal.

Angelicin (0.028) and psoralen (0.042%) isolated from seeds (*Pakistan J. Sci. Ind. Res.* 1972, *15*, 158; *Chem. Abstr.* 1973, *78*, 121302 u).

Distribution : Delhi and Punjab.

PTERIDIUM (Pteridaceae)

P. aquilinum (L.) Kuhn syn. *Pteris aquilina* L. (*Compend. Indian Med. Plants*, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 333).

An acidic polysaccharide - aquilinan - isolated which contains galactose, xylose, fucose and arabinose residues, together with chains of repeating $\alpha(1\rightarrow2')$glucuronosylmannose units (*Phytochemistry* 1976, *15*, 171); pterosins detected in its gametophytic cultures and pterosin F isolated from fronds of nonsporulating fungus (*Lloydia* 1977, *40*, 221).

PTERIS (Pteridaceae)

P. aquilina L.; see *Pteridium aquilinum* (L.) Kuhn

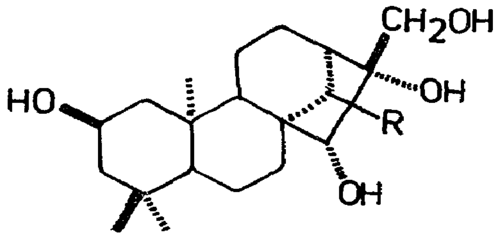
P. calomelanos (L.) Bedd.; see *Pityrogramma calomelanos* (L.) Link.

P. cretica L.

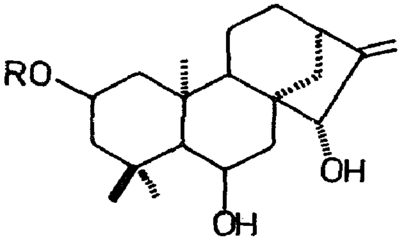
$2\beta,15\alpha,16\alpha$,17-Tetrahydroxy(-)kaurane (I), $2\beta,6\beta,15\alpha$-trihydroxy-(-)kaur-16-ene (II), $2\beta,14\beta,15\alpha,16\alpha$,17-pentahydroxy(-)kaurane (III), creticoside C and creticoside E isolated from rhizomes (*Chem. Pharm. Bull.* 1974, *22*, 1686).

Distribution : Throughout India, from sea level to 2500 m in the hills.

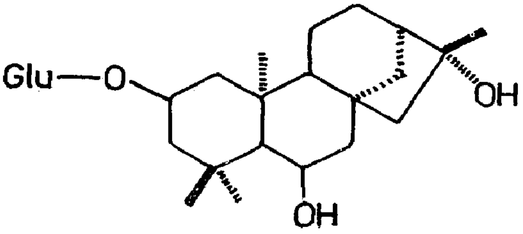
NEW COMPOUNDS



I
R = H
III
R = OH



II
R = H
Creticoside E
R = Glu



Creticoside C

P. longifolia L.; see *P. vittata* L.

P. vittata L. syn. *P. longifolia* auct. (non L.)

Palmitic acid, β-sitosteryl palmitate, β-sitosteryl acetate and n-triacontanyl hexacosanoate isolated (*J. Indian Chem. Soc.* 1978, *55*, 308).

Distribution : Tropical and sub-tropical regions of India.

P. wallichiana Agardh syn. *Campteria wallichiana* Moore

β-Sitosterol, β-sitosteryl palmitate and pterosin B isolated from rhizomes (*Indian J. Chem.* 1976, *14*B, 817); pterosin C and its 3-O-β-D-glucopyranoside isolated from rhizomes (*Indian J. Chem.* 1977, *15*B, 16).

Distribution : Himalayas including Nepal and Bhutan, alt. 900- 2400 m.

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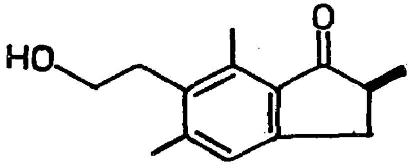
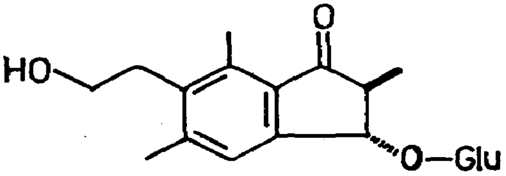


Pterosin B



Pterosin C-3-O-β-D-glucoside

PTEROCARPUS (Papilionaceae)

P. dalbergioides Roxb. syn. *P. indicus* Baker (non Willd.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 334).

Leaf extract (70 mg/kg/day, i.p.) administered to mice bearing Ehrlich ascites carcinoma significantly inhibited tumour growth; LD50 in mice 122 mg/kg, i.p. (*Eisei Shikensho Hokoku*) 1972, 69; *Chem. Abstr.* 1973, *79*, 49212 v).

P. indicus Baker; see *P. dalbergioides* Roxb.

P. marsupium Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 334).

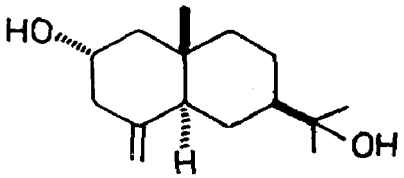
Pharmacogonstic studies on heartwood (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 81); alcoholic extract of stem significantly lowered blood sugar and improved glucose tolerance of rabbits (*J. Res. Indian Med.* 1971, *6*, 205).

P. santalinus L.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 334).

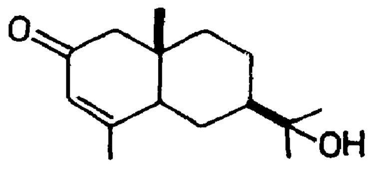
Alcoholic extract of plant produced depression in mice and rats at a dose of 1.0 g/kg and caused significant blockade of conditioned avoidance response at 0.5 to 2.0 g/kg. It also showed protection against electroshock seizure (ED50, 1.0 g/kg). At 1.0 to 2.0 g/kg dose it showed appreciable protection against carrageenin-induced oedema in rats. LD50 in rats was 4.0 g/kg (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 37).

Isolation and structure elucidation of santalin A (*Tetrahedron* 1972, *30*, 3503; *Curr. Sci.* 1974, *43*, 611); three new sesquiterpenes - pterocarptriol, isopterocarpolone and pterocarpodiolone - together with β-eudesmol, pterocarpol and cryptomeridiol isolated from heartwood (*Phytochemistry* 1974, *13*, 633); acetyloleanolic acid, acetyloleanolic aldehyde and erythrodiol isolated from sapwood (*Curr. Sci.* 1974, *43*, 611); structures of santalin B isolated from wood (*Curr. Sci.* 1974, *43*, 611; *J. Chem. Soc.* Perkin 1 1975, 186); lupeol, epilupeol, lupenone, lup-(20)29-ene, β-amyrone and sitosterol isolated from bark and leaves; β-amyrin, stigmasterol, erythrodiol and betulin also isolated from leaves (*Phytochemistry* 1975, *14*, 521; *Curr. Sci.* 1976, *45*, 516); structure and absolute configuration of pterocarpol (*Indian J. Chem.* 1976, *14*B, 905); a new triterpene - lupenediol - isolated from bark and its structure determined (*Phytochemistry* 1976, *15*, 1417); eudesmol isolated from heartwood found to be mixture of α-, β- and γ-isomers; absolute configuration of pterocarpol (*Indian J. Chem.* 1976, *14*B, 905).

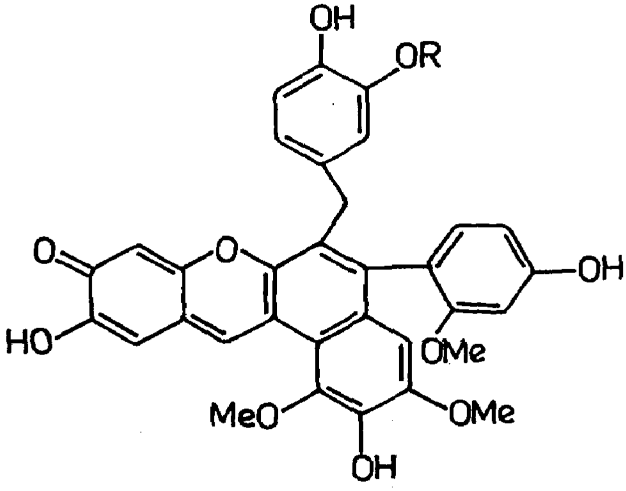
NEW COMPOUNDS



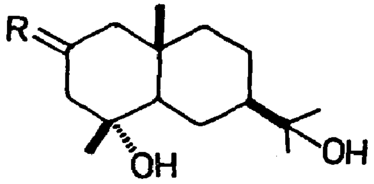
Pterocarpol



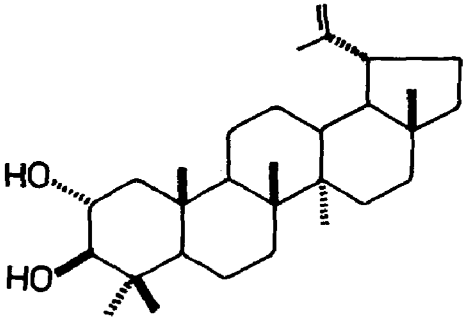
Isopterocarpolone



Santalin A
R = H
Santalin B
R = Me



Pterocarptriol
R = α-OH, β-H
Pterocarpdiolone
R = O



Lupenediol

PTEROSPERMUM (Sterculaceae)

P. acerifolium (L.) Willd. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 206).

Tyrosine, cystine, glycine, glucose, lactose, xylose and rhamnose isolated from seeds (*Proc. Nat. Acad. Sci.* India 1970, *40*A, 229; *Chem. Abstr.* 1972, *76*, 44009 h); kaempferol and kaempferide-7-β-D-glucopyranoside isolated from flowers (*Planta Med.* 1972, *21*, 358); a new acid polysaccharide isolated from bark composed of D-galacturonic acid, D-galactose and L-rhamnose in molar ratio of 5:3:3 (*J. Chem. Soc.* Perkin 1 1979, 1680); kaempferol-3-O-β-D-galactoside, luteolin, luteolin-7-O-glucoside and luteolin-7-O-β-D-glucuronide isolated (*Indian J. Pharm. Sci.* 1979, *41*, 72).

P. canescens Roxb. syn. *P. suberifolium* (L.) Lamk. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 207).

β-Sitosterol and a mixture of fatty acids which contained myristic, palmitic, stearic, arachidic, oleic and linoleic acids isolated from flowers (*Indian J. Appl. Chem.* 1970, *33*, 90;

Chem. Abstr. 1971, *75*, 1333 w); kaempferol, its 3-β-galactoside and 3-rutinoside, quercetin, its 3-O-arabinoside and 3-O-rhamnoside isolated (*Indian J. Pharm. Sci.* 1979, *41*, 72).

P. heyneanum Wall. ex W. & A.; see *P. xylocarpum* (Gaertn.) Sant. & Wagh

P. suberifolium (L.) Lamk.; see *P. canescens* Roxb.

P. xylocarpum (Gaertn.) Sant. & Wagh syn. *P. heyneanum* Wall. ex W. & A. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 207).

Kaempferol, kaempferide-7-O-glucoside and β-sitosterol isolated from stems (*J. Indian Chem. Soc.* 1977, *54*, 916); kaempferol-3-O-β-D-galactoside and quercetin-3-O-β-D-galactoside isolated (*Indian J. Pharm. Sci.* 1979, *41*, 72).

PUERARIA (Papilionaceae)

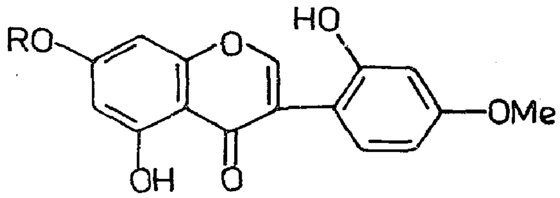
P. lobata (Willd.) Ohwi

A new isoflavone glycoside - irisolidone-7-O-glucoside - isolated from flowers (*Phytochemistry* 1973, *12*, 2547; *Farm. Zh.* 1978, 83; *Chem. Abstr.* 1979, *91*, 2506 x); daidzein, daidzin, puerarin and a new isoflavonoid glycoside - daidzein-4',7-diglucoside, mp. 241° - isolated from roots (*Chung Hua I Hsueh Tsa Chih* 1974, *54*, 271; *Chem. Abstr.* 1975, *82*, 47672 d; *Farm. Zh.* 1979, 76; *Chem. Abstr.* 1979, *91*, 71727 g); six flavonoids isolated from flowers, two of these identified as irisolidone-7-glucoside and 7-xylosylglucoside (*Farm. Zh.* 1978, *83*; *Chem. Abstr.* 1979, *91*, 2506); robinin (1.8%) isolated from leaves (*Farm. Zh.* 1979, 52; *Chem. Abstr.* 1979, *91*, 154325 a); formononetin isolated from rhizomes (*Farm. Zh.* 1979, 76; *Chem. Abstr.* 1979, *91*, 71727 g).

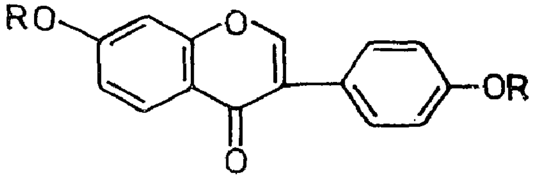
Distribution : Native of China and Japan, introduced into India.

Note : Some taxonomists consider *P. triloba* (Lour.) Makino as the correct name for this plant.

NEW COMPOUNDS



Irisolidone-7-O-glucoside
R = Glu
Irisolidone-7-xylosylglucoside
R = Xyl-Glu

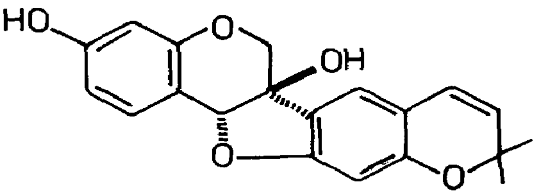


Daidzein-4',7-diglucoside
R = Glu

P. tuberosa (Roxb. ex Willd.) DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 334).

A new pterocarpan - tuberosin - isolated from roots and tubers and its structure determined (*Indian J. Chem.* 1972, *10*, 1112; *J. Chem. Soc.* Perkin 1 1973, 907).

NEW COMPOUNDS



Tuberosin

PULICARIA (Asteraceae)

P. crispa (Forsch.) Benth. & Hook. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 207).

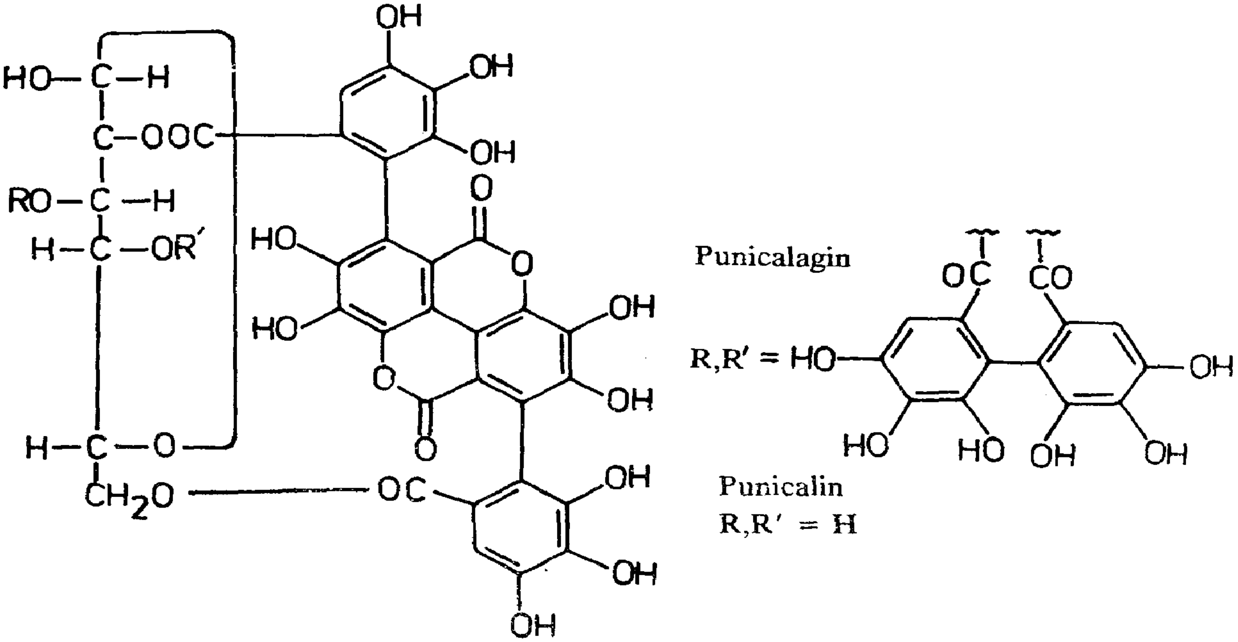
β-Sitosterol (0.23), β-amyrin (0.1), a neutral triterpene, mp. 274° and choline (0.08%) isolated from Saudi Arabian plant; quercetin detected by TLC (*Egypt. J. Pharm. Sci.* 1977, *16*, 421; *Chem. Abstr.* 1978, *89*, 126140 b).

PUNICA (Punicaceae)

P. granatum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 335).

Sitosterol and ursolic acid isolated (*Phytochemistry* 1973, *12*, 214); two tannins - punicalagin and punicalin - isolated from peels and their structures determined; hydrolysis of punicalagin yielded ellagic acid and punicalin, the latter yielded glucose and a tetralactone (*Ann. Chem.* 1977, 1976); pectin isolated from fruits contained mannose, galactose, rhamnose, arabinose and glucose in ratio of 1:1.3:2.1:4.4:6.2; principal sugar acid was galacturonic acid (*Khim. Prir. Soedin.* 1978, *14*, 393; *Chem. Abstr.* 1978, *89*, 126156 m).

NEW COMPOUNDS



Punicalagin

Punicalin
R,R' = H

PUPALIA (Amaranthaceae)

P. atropurpurea (Lamk.) Moq.; see *P. lappacea* (L.) Juss.

P. lappacea (L.) Juss. syn. *P. atropurpurea* (Lamk.) Moq.
H. - Jhojhru, Dinka tara, Bhurat, Chirehatta; Guj. - Gadarjhipato; Tam. - Adai-otti.
α- And β-spinasterols isolated (*Plant Biochem. J.* 1977, *4*, 14; *Chem. Abstr.* 1977, *87*, 148715 d).
Distribution : Almost throughout India, ascending to 1000 m in western Himalayas.

PUTRANJIVA (Euphorbiaceae)

P. roxburghii Wall. see *Drypetes roxburghii* (Wall.) Hurus.

PYGEUM (Rosaceae)

P. acuminatum Coleb.; see *Prunus ceylanica* (Wt.) Miq.

P. gardneri Hook.f.; see *Prunus ceylanica* (Wt.) Miq.

P. glaberrimum Hook.f.; see *Prunus ceylanica* (Wt.) Miq.

P. wightianum Bl. ex C. Muell.; see *Prunus ceylanica* (Wt.) Miq.

P. wightianum Bl. ex C. Muell. var. *parvifolium* Thw. ex Hook.f.; see *Prunus ceylanica* (Wt.) Miq.

PYROSTEGIA (Bignoniaceae)

P. venusta (Ker-Gawl.) Miers syn. *Bignonia venusta* Ker-Gawl.
β-Sitosterol, n-hentriacontane, acacetin-7-O-β-D-glucopyranoside and meso-inositol isolated (*J. Indian Chem. Soc.* 1976, *53*, 378).
Distribution : Grown commonly in gardens for its showy flowers.

PYRUS (Rosaceae)

P. aucuparia Gaertn.; see *Sorbus aucuparia* L.

P. malus L.; see *Malus pumila* Mill.

P. pashia Buch.-Ham. ex D. Don (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 336).
β-Sitosterol and its glucoside isolated (*Phytochemistry* 1971, *10*, 2247, 2829).

P. sikkimensis Hook.f.
Triacontane, myricyl alcohol, friedelin, β-amyrin and β-sitosterol isolated from plant (*J. Indian Chem. Soc.* 1971, *48*, 297).
Distribution : Sikkim and Bhutan, alt. 2000-3000 m

QUAMOCLIT (Convolvulaceae)

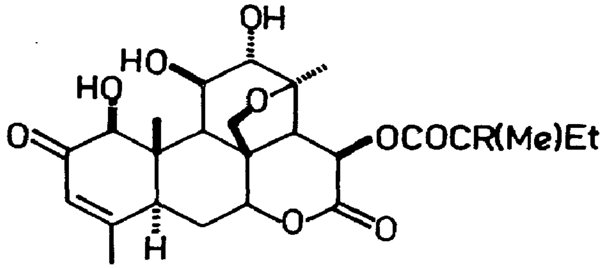
Q. pinnata (Desr.) Bojer (*pennata*); see *Ipomoea quamoclit* L.

QUASSIA (Simaroubaceae)

Q. amara L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 336).

A new antileukaemic quassinoid - quassimarin - isolated along with simalikalactone D and their structures determined (*J. Org. Chem.* 1976, *14*, 3481).

NEW COMPOUNDS



Quassimarin
R = OAc
Simalikalactone D
R = H

Q. indica (Gaertn.) Nooteb.; see *Samadera indica* Gaertn.

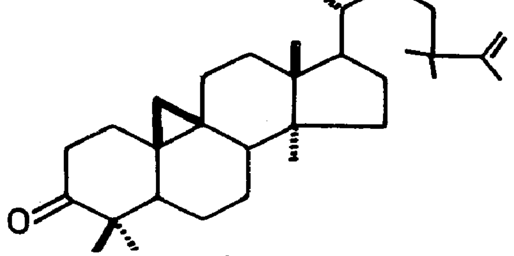
QUERCUS (Fagaceae)

Q. glauca Thunb.

Structure elucidation of cyclobalanone isolated from leaves; 24-methylenecycloartanone also isolated (*Chem. Pharm. Bull.* 1971, *19*, 2193; *Yakugaku Zasshi* 1976, *96*, 1207; *Chem. Abstr.* 1977, *86*, 27650 z); sitosterol, stigmast-4-en-3-one, friedelin, epifriedelinol, glutinol, *β*-amyrin acetate and lupeol isolated from trunk wood (*Phytochemistry* 1974, *13*, 522; *Yakugaku Zasshi* 1976, *96*, 1207; *Chem. Abstr.* 1977, *86*, 27650 z).

Distribution : Himalayas from Kashmir to Bhutan, alt. 900-1800 m, Khasi Hills, alt. 600-1400 m.

NEW COMPOUNDS



Cyclobalanone

Q. ilex L.

P. - Brechur, Irri.

Fatty acis (C_{12}-C_{28}), friedelin, sitosterol and lupeol isolated (*Phytochemistry* 1972, *11*, 3089).

Distribution : Inner arid tracts of Himalayas from Sutlej valley westward and in Kashmir, alt. 900-2600 m.

Q. infectoria Oliv. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 208).

A fraction of methanol extract of galls showed analgesic activity in rats and significantly reduced blood pressure in rabbits. Another fraction showed CNS-depressant activity and moderate antitremorine activity by causing a delay in onset and decrease in severity of tremorine-induced tremors. It also showed anaesthetic action due to complete blockade of isolated frog sciatic nerve conduction (*J. Pharm. Sci.* 1976, *65*, 1791); CNS activity shown by alcoholic extract was due to syringic acid (*Planta Med.* 1977, *31*, 286).

Methyl betulate, methyl oleanolate and sitosterol isolated from galls (*Phytochemistry* 1973, *12*, 214); syringic, gallic and ellagic acids isolated from galls (*Planta Med.* 1977, *31*, 286).

Q. lanceaefolia Roxb.

Friedelin, lignoceryl alcohol, ferulic acid, lignoceryl ferulate, canophyllal, canophyllol and maslinic acid isolated (*Phytochemistry* 1971, *10*, 2831).

Distribution : Sikkim and Bhutan Himalayas, alt. 300-600 m, Khasi Hills and Manipur.

Q. pachyphylla Kurz (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 208).

Friedelin, lignoceryl alcohol, canophyllol, β-sitosterol, its glucoside and oleanolic acid isolated (*Indian J. Pharm.* 1970, *32*, 167).

Q. polystachya Wall. ex DC.; see *Lithocarpus polystachya* (Wall. ex DC.) Rehd.

Q. semicarpifolia Smith

Nep. - Ghesi, Kasru; P. - Banchar; Khareu, Klarshu; Kumaon - Karshu.

Friedelin, β-sitosterol, quercetin-3-O-L-rhamnoside and pelargonidin-3-D-glucoside isolated from bark (*Nat. Appl. Sci. Bull.* 1975, *27*, 91; *Chem. Abstr.* 1977, *86*, 185951 c).

Distribution : Himalayas from Kashmir eastward upto Bhutan, Assam and Manipur, alt. 1800-3600 m.

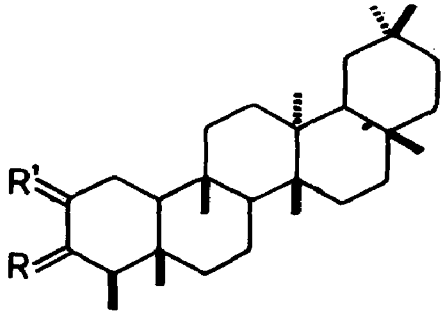
Q. suber L.

Eng. - Cork oak.

Two new triterpenoids - 3α-hydroxyfriedel-2-one and 2β-acetoxyfriedel-3-one - isolated from bark and their structures determined; friedelin, cerin, canophyllol, 3-hydroxyfriedel-3-en-2-one and betulinic acid also isolated (*Indian J. Chem.* 1978, *16*B, 361).

Distribution : Indigenous to shore areas of western Mediterranean region, introduction attempted in the Nilgiris.

NEW COMPOUNDS



3α-Hydroxyfriedel-2-one
R = α-OH,H, R′ = O
2β-Acetoxyfriedel-3-one
R = O, R′ = β-OAc,H

QUISQUALIS (Combretaceae)

Q. indica L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 337).

Rutin and pelargonidin-3-glucoside isolated from flowers; rutin also isolated from leaves (*Indian J. Chem.* 1979, *18*B, 291).

RADERMACHERA (Bignoniaceae)

R. xylocarpa (Roxb.) K. Schum. syn. *Stereospermum xylocarpum* Benth. & Hook.f. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 208).

Dinatin-7-glucuronide isolated from leaves (*Phytochemistry* 1972, *11*, 1499); acetyloleanolic acid isolated from roots (*Indian J. Chem.* 1977, *15*B, 291).

RAMALINA (Usneaceae)

R. farinacea (L.) Ach.

(+)Usnic, evernic and obtusatic acids isolated (*Curr. Sci.* 1976, *45*, 517).

Distribution : Kumaon, Nilgiris, Kodaikanal and Darjeeling.

RANDIA (Rubiaceae)

R. dumetorum Lamk.; see *Xeromphis spinosa* (Thunb.) Keay

R. tetrasperma (Roxb.) Benth. & Hook.f. ex Brandis

H. - Bhotiya ghingaru, Ghara; P. - Kikra.

Mannitol, scopoletin, randialic acids A and B isolated (*Planta Med.* 1977, *32*, 229).

Distribution : Himalayas, from Kashmir to Arunachal Pradesh and Assam upto 2000 m.

RAUVOLFIA (Apocynaceae)

R. serpentina (L.) Benth. ex Kurz (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 339).

Improved method of isolation of ajmaline (USSR 613,757 (1978) July 5; *Chem. Abstr.* 1978, *89*, 135843 k).

BIOLOGICAL ACTIVITY

Ajmaline was evaluated in cardiac arrhythmia model in dog and was found more effective in arrhythmias of ectopic focus type than in circus movement model. It decreased the excitability and increased the functional refractory period of all heart tissues. It also showed moderate degree of anticholinergic activity. It showed hypotensive activity in dogs and human patients (*J. Pharmacol. Exp. Ther.* 1975, *193*, 182); efficacy of ajmaline in human patients suffering from digitoxic arrhythmias was found to be the same (85.1%) as by treatment with oral potassium chloride (*Indian J. Med. Sci.* 1978, *32*, 71); hypotensive effect of ajmaline was apparently mediated through its ganglion blocking activity (*Farmakol. Prir. Veschestv* 1978, *32*; *Chem. Abstr.* 1979, *91*, 49389 b).

Reserpinine depressed general behaviour of mice, prolonged the action of soporifics, decreased body temperature in doses of 50 mg/kg and had hypotensive action at 1 mg/kg (*Farmakol. Alkaloidov Serdech. Glikozidov* 1971, 33; *Chem. Abstr* 1972, *77*, 109457 v); in isolated perfused rabbit heart, reserpine (1 μg/ml) produced partial failure of impulse transmission due to decrease in noradrenaline released by sympathetic nerve stimulation (*Jpn. J. Pharmacol.* 1970, *20*, 442); reserpine (2.5 mg/kg, i.p.) decreased levels of glutamic acid, alanine and glycine in sensory ganglia, glutamic acid level in sympathetic ganglia and levels of glutamic and aspartic acids in spinal cord in cats (*Brain Res.* 1972, *47*, 167; *Chem. Abstr.* 1973, *78*, 52854 m); reserpine (5 mg/kg, i.v.) reduced or abolished sympathetically-induced responses of stomach to perivascular nerve stimulation after 4-5 hr in anaesthetised dogs pretreated with either atropine or atropine plus phenoxybenzamine (*Jpn. J. Pharmacol.* 1972, *22*, 167); reserpine (10 mg/kg) raised serum gastrin concentration of fasting unoperated rats for a period of 6 to 10 hr. after injection. It also reduced histidine decarboxylase activity in rat stomach (*J. Pharmacol. Exp. Ther.* 1974, *189*, 603); reserpine (1 mg/kg, i.v.) in dog produced slight fall in blood pressure, but same dose given after pretreatment with various sympathomimetic amines caused marked rise in blood pressure; maximum pressor response was seen after mephentermine and amphetamine pretreatment and minimum after tyramine and methoxamine pretreatment (*Indian J. Med. Sci.* 1974, *28*, 255); reserpine (0.25, 0.5 and 1 mg/kg, i.p.) decreased mean blood pressure and heart rate of anaesthetised rabbits; pretreatment with reserpine produced supersensitivity in these animals to hypotensive and positive chronotropic effect of isoprenaline (*J. Pakistan Med. Assoc.* 1976, *26*, 162; *Chem. Abstr.* 1977, *87*, 95977 g); reserpine (2.5 mg/kg, i.p.) administered to rats immediately before exposure to hypoxic condition, prevented hypothermia, which was probably due to endogenous amines released by reserpine (*Boei Eisei* 1975, *22*, 237; *Chem. Abstr.* 1977, *87*, 48087 g); reserpine-treated atria had greater resting and maximum rates of beat than untreated atria. Atria

pretreated with reserpine (1 or 3 mg/kg) were supersensitive to inotropic effect of norepinephrine. Reserpine at 3, 1 and 4 mg/kg dose increased content of sodium, potassium and magnesium respectively in atria and at 4 mg/kg decreased calcium content (*Arch. Int. Pharmacodyn. Ther.* 1976, *223*, 324; *Chem. Abstr.* 1977, *86*, 37523 z).

Reserpine (5 mg/kg) decreased brain calcium level in rabbits, rats and mice after fifteen minutes (*Bratisl. Lek. Listy* 1976, *65*, 513; *Chem. Abstr.* 1977, *86*, 65575 m); reserpine (1 mg/kg, s.c.) was administered to pregnant rats at different periods of gestation; rats born to mothers who received drug upto sixth day before delivery showed early postnatal adrenal catecholamine depletion attributable to a direct action of the drug (*J. Pharmacol. Exp. Ther.* 1976, *197*, 293); reserpine decreased calcium content in brain, smooth and skeletal muscles and liver of rabbits, rats and mice 24 hr. after treatment. Pretreatment with antidepressants inhibited calcium-depleting effect of reserpine in brain and aortic tissue (*Congr. Hung. Pharmacol. Soc.* 1976, 2, 163; *Chem. Abstr.* 1978, *88*, 130845 g); a review of absorption, distribution, metabolism and excretion of reserpine (*Pharmacol. Rev.* 1976, *26*, 179; *Chem. Abstr.* 1977, *87*, 95077 p); a review on chemistry, metabolism and pharmacology of reserpine and related alkaloids (*Psychopharmacology* 1977, 2, 1101; *Chem. Abstr.* 1977, *87*, 95174 t).

Male guinea pigs injected s.c. with different doses of reserpine (50, 200 μg and 2 mg) for 7 or 14 days showed increased levels of lipids and glycogen in heart (*Malays. J. Sci.* 1976, *4*, 37; *Chem. Abstr.* 1978, *89*, 361 f); prolactin was not detectable in young sheep foetuses after administration of reserpine (2.5 mg, i.v.); same dose of reserpine did not raise plasma prolactin level in older foetuses, the only cardiovascular effect was slight bradycardia; however, maternal plasma prolactin rose markedly after short delay in all animals (*Biol. Neonate* 1976, *30*, 25; *Chem. Abstr.* 1977, *87*, 62533 f); reserpine (5 mg, i.m.) caused rapid (within 30 min.) and sustained (at least 24 hr.) elevation of serum prolactin in dairy cows; peak level (283 ng/ml) was observed at 3 hr. post-injection; serum glucocorticoid and growth hormone concentrations were unaffected (*Proc. Soc. Exp. Biol. Med.* 1977, *155*, 189; *Chem. Abstr.* 1978, *88*, 164252 b).

Reserpine (0.01-1 μg/ml) competitively inhibited contractile response to calcium of isolated vas deferens from normal or reserpine-pretreated rats; direct anticontractile action of reserpine may be due to metabolic block making calcium less available at sites of muscle contraction (*Farm. Ed. Sci.* 1977, *32*, 897; *Chem. Abstr.* 1978, *88*, 58289 j); reserpine administered to Indian koel (0.25 mg/bird) twice on alternate days caused decrease in weight of ovary and oviduct and hypotrophy of intrafollicular masses of ovary, with disintegration of interstitial cell mass (*Indian J. Exp. Biol.* 1977, *15*, 349); reserpine decreased tachycardia (31%) in hyperthyroid guinea pigs, 24 hr. after injection; a slight increase in heart rate was observed due to catecholamine release (*IRCS Med. Sci. Libr. Compend.* 1977, *5*, 238; *Chem. Abstr.* 1977, *87*, 95797 y); toxicity of reserpine in pigs was increased by hyperthyroidism induced by thyroxine (*IRCS Med. Sci. Libr. Compend.* 1977, *5*, 183; *Chem. Abstr.* 1977, *87*, 62670 y); intracerebroventricular administration of reserpine (5-10 μg) initially enhanced urine outflow for 5-30 minutes in about 60% of rats, followed by inhibition (*Igaku No Ayumi* 1978, *104*, 107; *Chem. Abstr.* 1978, *88*, 99225 d); reserpine (25 mg/kg/day for 3 days, i.p.) administered to frogs,

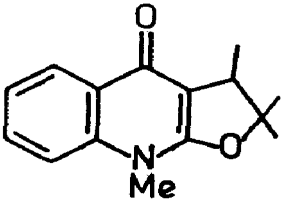
darkened their skin colour and decreased dopamine level by about 50% in heart and brain (*Jpn. J. Pharmacol.* 1978, *28*, 493); reserpine (100 μg/day for 6-18 days, s.c.) decreased rat uterine glycogen (*Curr. Sci.* 1978, *47*, 603).

RAVENIA (Rutaceae)

R. spectabilis Engl. syn. *Limonia spectabilis* Lindl. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 343).

Structure of lemobiline established by its partial synthesis and conversion to (-)ravenoline (*Tetrahedron Lett.* 1971, 2683).

NEW COMPOUNDS



Lemobiline

REMIREA (Cyperaceae)

R. maritima Aubl.; see *Cyperus pedunculatus* (R. Br.) Kern

RESEDA (Resedaceae)

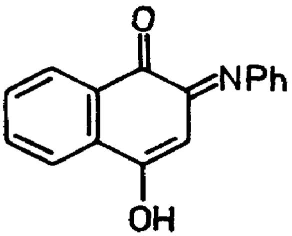
R. luteola L.

Eng. - Dyer's rocket, Weld.

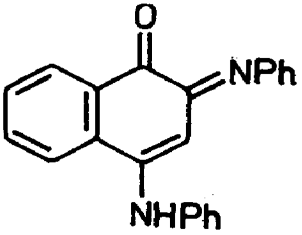
Resedine, resedinine, phenyl-β-naphthylamine and β-hydroxyphenylethylamine isolated from aerial parts (*Khim. Prir. Soedin.* 1976, *12*, 625; *Chem. Abstr.* 1977, *86*, 117596 r; *Khim. Prir. Soedin.* 1977, *13*, 826; *Chem. Abstr.* 1978, *89*, 75412 g); two new alkaloids - lutine and lutinine - isolated from aerial parts and characterised along with cinnamamide (*Khim. Prir. Soedin.* 1977, *13*, 826; *Chem. Abstr.* 1978, *89*, 75412 g);

Distribution : Indigenous to western Europe, grown in Indian gardens.

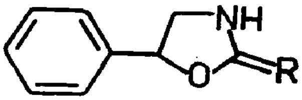
NEW COMPOUNDS



Lutine



Lutinine

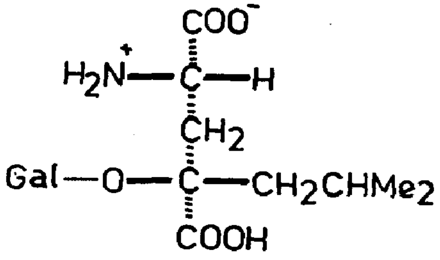


Resedine
R = O
Resedinine
R = S

R. odorata L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 344).

2-Hydroxybenzenemethanamine and its 2-O-α-L-rhamnopyranoside isolated (*Biochem. Physiol. Alkaloids, Int. Symp.* 4th 1969, 113; *Chem. Abstr.* 1972, *77*, 98695 t); 2-hydroxybenzylamine and 2-(α-L-rhamnopyranosyloxy)benzylamine isolated from flowers (*Phytochemistry* 1970, *9*, 865); a new amino acid - 2(S),4(R)4-(β-D-galactopyranosyloxy)-4-isobutyl glutamic acid (I) - isolated from flowers (*Phytochemistry* 1973, *12*, 1713).

NEW COMPOUNDS



I

RHAMNUS (Rhamnaceae)

R. nepalensis (Wall.) Laws. (*nipalensis*) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 211).

Physcion, lupeol, emodin, rhamnocitrin, citreorosein, rhamnetin, β-sitosterol, its β-D-glucoside, rhamnocitrin-3-O-α-L-rhamnopyranosyl-(1→3)-O-α-L-rhamnopyranosy(1→6)-β-D-galactopyranoside and rhamnetin-3-O-α-L-rhamnopyranosyl(1→2)-O-α-L-rhamnopyranosyl-(1→6)-β-D-galactopyranoside isolated (*Indian J. Chem.* 1979, *17*B, 89).

R. triquetra Wall. ex Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 211).

Emodin and frangulin isolated from heartwood (*Phytochemistry* 1973, *12*, 1826).

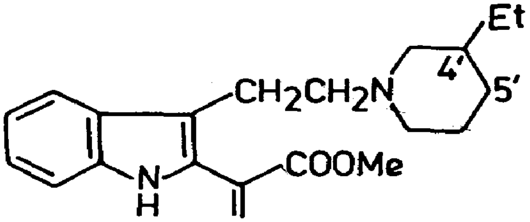
RHAZYA (Apocynaceae)

R. stricta Decne. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 344)

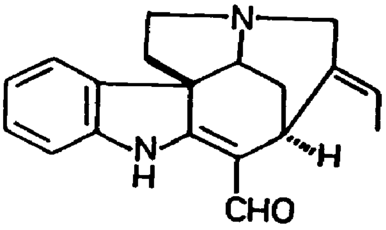
Isolation and structure elucidation of sewarine (*Chem. Commun.* 1970, 538; *J. Pharm. Sci.* 1971, *60*, 1581); tetrahydrosecodine and dihydrosecodine isolated (*Chem. Commun.* 1970, 189); structure of rhazinilam determined (*Tetrahedron Lett.* 1972, *909*, 913); rhazine estimated in leaves, roots and stems as 3.92, 2.21 and 0.96% respectively, seeds did not contain rhazine (*Bull. Fac. Sci. Riyadh Univ.* 1977, *8*, 331); *Chem. Abstr.* 1979, *90*, 200321 a); (-)quebrachamine, rhazine (akuammidine), rhazinine, rhazinilam, strictamine, geissoschizine and a new base - rhazinaline - isolated from leaves; rhazinaline characterised as 16-formyl-16-epistrictamine and structure of geissoschizine confirmed (*Bull. Chem. Soc. Jpn.* 1976, *49*, 2000); isolation of strictamine, strictalamine and nor-C-fluorocurarine; crystal structure and absolute configura-

tion of former two alkaloids (*J. Am. Chem. Soc.* 1977, *99*, 1943).

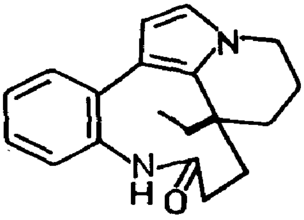
NEW COMPOUNDS



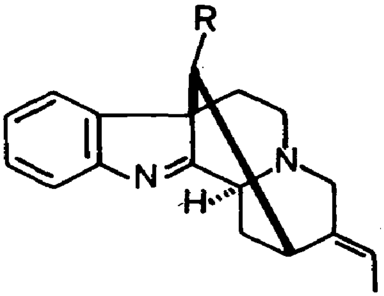
Tetrahydrosecodine
Dihydrosecodine
4′,5′ = Δ



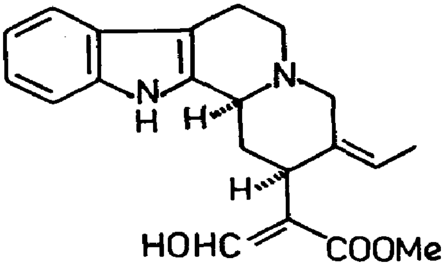
Nor-C-fluorocurarine



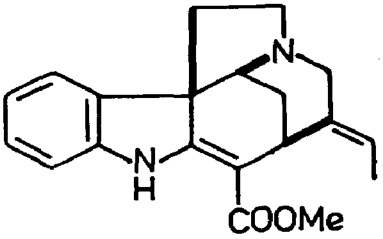
Rhazinilam



Strictamine
R = COOMe
Strictalamine
R = CHO



Geissoschizine



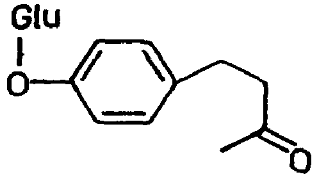
Sewarine

RHEUM (Polygonaceae)

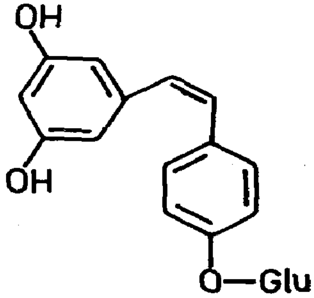
R. palmatum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 345).

Two new phenolic glucosides - 4-hydroxyphenyl-2-butanone-β-D-glucoside (I), mp. 110°, and 3,5-dihydroxystilbene-4′-O-β-D-glucopyranoside II, mp. 235° - isolated from rhizomes (*Tetrahedron Lett.* 1972, 2965); sennoside D, citreorosein, laccaic acid D and three unidentified hydroxyanthraquinones isolated from roots of a hybrid variety (*Shoyakugaku Zasshi* 1978, *32*, 19; *Chem. Abstr.* 1978, *89*, 65178 w).

NEW COMPOUNDS



I



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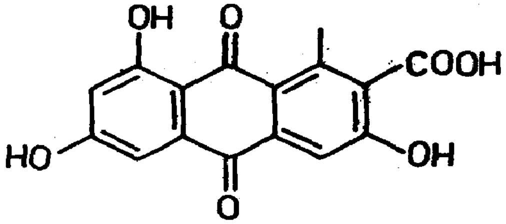


Laccaic acid D

RHIZOPHORA (Rhizophoraceae)

R. apiculata Blume syn. *R. conjugata* auct. (non L.)

Two stereoisomers of procyanidin isolated from bark (*Indian J. Chem.* 1971, 9, 928).

Distribution : Tidal marshes of coastal regions of India and Andaman & Nicobar Islands.

R. conjugata L.; see *R. apiculata* Blume

RHODIOLA (Crassulaceae)

R. linearifolia (Royle) Fu; see *R. sinuata* (Royle ex Edgew.) Fu

R. quadrifida (Pall.) Fisher & Meyer syn. *Sedum quadrifidum* Pall., *S. asiaticum* (D. Don) DC. p.p.

Salidroside, tyrosol, gallic acid, kaempferol and quercetin found in southern Siberian plant (*Usp. Izuch. Lek. Rast. Sib. Mater. Mezhvuz. Nauch. Konf.* 1973, 70; *Chem. Abstr.* 1974, *81*, 166334 j; *Issled. Lek. Prep. Prir. Sint. Proiskhozhd. Mater. Mezhuvz. Nauchn. Konf.* 1975, 97; *Chem. Abstr.* 1977, *86*, 167873 z).

Distribution : Himalayas, from Kashmir to Sikkim, alt. 3300-5400 m.

R. sinuata (Royle ex Edgew.) Fu syn. *Sedum linearifolium* Royle, *S. linearifolium Royle* var. *pauciflorum* (Edgew.) Clarke, *S. trifidum* Wall. ex Hook.f. & Thoms. p.p., *R. linearifolia* (Royle) Fu

p-Tyrosol and gallic acid isolated from roots (*Issled. Lek. Prep. Prir. Sint. Proiskhozhd. Mater. Mezhvuz. Nauchn. Konf.* 1975, 113; *Chem. Abstr.* 1977, *86*, 167875 b); salidroside, tyrosol, pyrogallol and phloroglucinol isolated (*Usp. Izuch. Lek. Rast. Sib. Mater. Mezhvuz. Nauch. Konf.* 1973, 72; *Chem. Abstr.* 1974, *81*, 166335 k).

Distribution : Himalayas, from Kashmir to Nepal, alt. 1800-3600 m.

RHODODENDRON (Ericaceae)

R. anthopogon D. Don ssp. *hypenanthum* (Balf.f.) Cullen syn. *R. anthopogon* auct. (non D. Don) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 213).

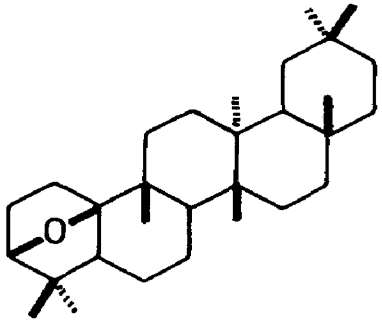
β-Sitosterol, friedelin, ursolic acid and quercetin isolated from leaves (*Indian J. Pharm. Sci.* 1978, *40*, 100).

R. anthopogon D. Don; see *R. anthopogon* D. Don ssp. *hypenanthum* (Balf.f.) Cullen

R. arboreum Sm. syn. *R. nilagiricum* Zenk., *R. cinnamomeum* Wall. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 346).

β-Sitosterol, friedelin, ursolic acid and quercetin isolated from leaves (*Indian J. Pharm. Sci.* 1978, *40*, 100); 3,10-epoxyglutinane isolated and its structure elucidated; α- and β-amyrins and ursolic acid also isolated (*Curr. Sci.* 1978, *47*, 768).

NEW COMPOUNDS



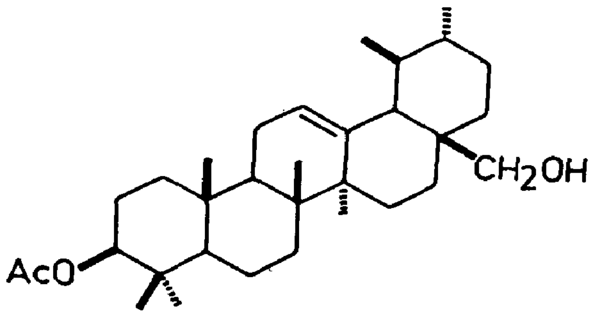
3,10-Epoxyglutinane

R. cinnamomeum Wall.; see *R. arboreum* Sm.

R. falconeri Hook.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 347).

Betulinic acid, taraxerol, taraxeryl acetate, β-sitosterol and a new triterpenoid - uvaol-3-acetate - isolated from bark (*J. Indian Chem. Soc.* 1969, *46*, 775).

NEW COMPOUNDS



Uvaol-3-acetate

R. grande Wight (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 347).

2-Acetyl-1-naphthol isolated from stem bark (*Curr. Sci.* 1970, *39*, 209).

R. hodgsonsii Hook.f.

Nep. - Korling.

Campanulin, friedelin, α-amyrin, β-amyrin, uvaol and ursolic acid isolated from leaves (*J. Indian Chem. Soc.* 1970, *47*, 713).

Distribution : Himalayas, from Nepal eastwards, alt. 2100-3600 m.

R. nilagiricum Zenk.; see *R. arboreum* Sm.

R. niveum Hook.f.

β-Sitosterol, vitexin and friedelin isolated (*Phytochemistry* 1971, *10*, 2247); hentriacontane, hentriacontanol, α-amyrin, epifriedelinol, quercetin-3-galactoside and quercetin-3-glucoside isolated (*Phytochemistry* 1972, *11*, 2621).

Distribution : Eastern Himalayas, alt. 3000-3600 m.

RHODOMYRTUS (Myrtaceae)

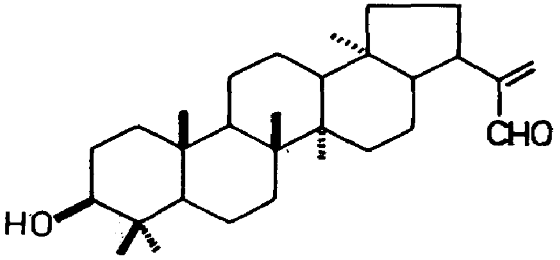
R. tomentosa (Ait.) Hassk.

Tam. - Thaontay.

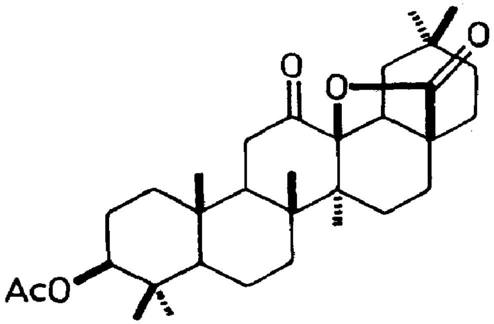
Two new triterpenoids - 3β-hydroxy-21αH-hop-22(29)-en-30-al (I) and 3β-acetoxy-12-oxo-oleanan-28,13β-olide (II) - along with 21αH-hop-22(29)-en-3β-30-diol, 3β-acetoxy-11α,12α-epoxyoleanan-28,13β-olide and 3β-acetoxy-12α-hydroxyoleanan-28,13β-olide isolated and characterised (*Phytochemistry* 1976, *15*, 1741).

Distribution : Pulney and Nilgiri Hills in Tamil Nadu.

NEW COMPOUNDS



I



II

RHUS (Anacardiaceae)

R. cotinus L.; see *Cotinus coggygria* Scop.

R. coriaria L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 213).

Myricetin- and quercetin-3-O-α-L-rhamnofuranosides, avicularin and astragalin isolated from leaves (*Khim. Prir. Soedin.* 1970, *6*, 627; *Chem. Abstr.* 1971, *74*, 50528 b); palmitic, stearic,

oleic and linoleic acids and phospholipids found in seed oil (*J. Iraqi Chem. Soc.* 1977, *2*, 87; *Chem. Abstr.* 1978, *88*, 133276 h).

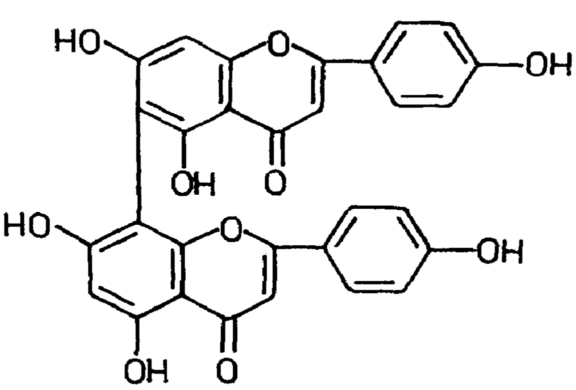
R. parviflora Roxb. ex DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 213).

Isorhamnetin-3-α-L-arabinoside isolated (*Phytochemistry* 1971, *10*, 2829); myricetin, quercetin, kaempferol, myricitrin, quercitrin, afzelin, p-coumaric and caffeic acids isolated from leaves (*Curr. Sci.* 1977, *46*, 448).

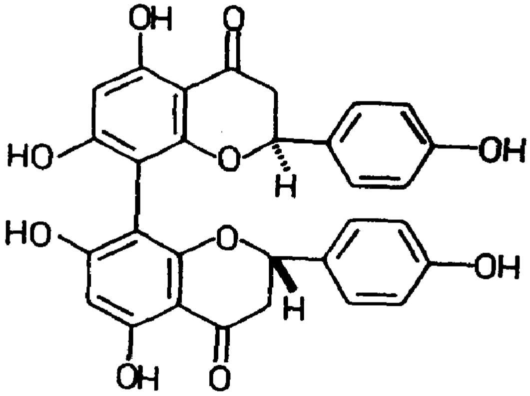
R. succedanea L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 348).

Rhusflavanone, hinokiflavone, amentoflavone, agathisflavone, cupressuflavone and mesuaferrones A and B isolated (*Tai-wan K'o Hsueh* 1973, *26*, 100; *Chem. Abstr.* 1973, *79*, 15857 q; *Tetrahedron Lett.* 1973, 4747; *Phytochemistry* 1974, *13*, 276, 657); structure of rhusflavone determined as 6,8''-naringeninyl apigenin (*Phytochemistry* 1974, *13*, 1571); succedaneaflavanone, mp. 318°, isolated from seed kernel and characterised as 6,6''-binaringenin (*Phytochemistry* 1975, *14*, 1644); neorhusflavanone isolated and structure assigned as 8,8''-binaringenin (*Heterocycles* 1978, *9*, 663).

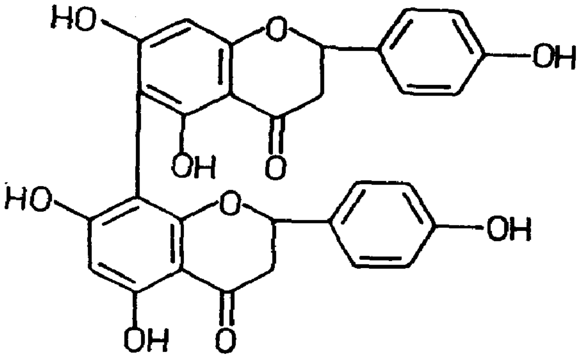
NEW COMPOUNDS



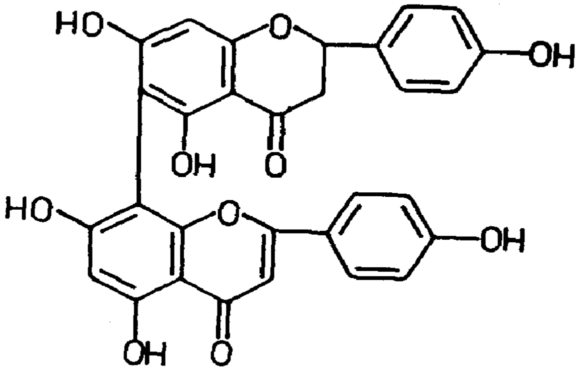
Agathisflavone



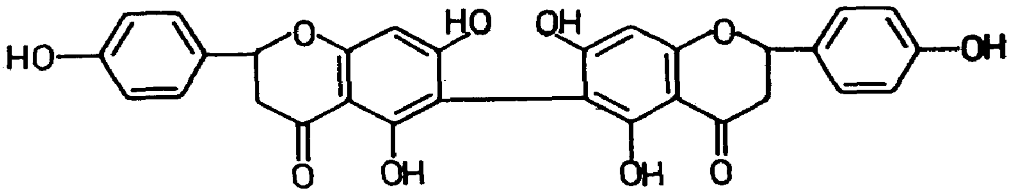
Neorhusflavanone



Rhusflavanone



Rhusflavone



Succedaneaflavanone

RHYNCHOSIA (Papilionaceae)

R. minima (L.) DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 214).

Proanthocyanidins isolated from seeds (*Curr. Sci.* 1974, *43*, 792); C6-glucosylapigenin (isovitexin), C6-glucosyl-C8-arabinosylapigenin, (schaftoside), di-C6,8-glucosylapigenin (vicenin-2), and C6-glucosyl-C8-xylosylapigenin (vicenin-3) isolated from leaves (*Phytochemistry* 1977, *16*, 498).

RIBES (Grossulariaceae)

R. nigrum L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 214).

(+)Hardwickiic acid isolated from buds (*Helv. Chim. Acta* 1974, *57*, 1247); 3-glucosylmyricetin, 3-glucosylquercetin, 3-glucosylisorhamnetin, rutin and 3-rhamnoglucosylmyricetin isolated from buds (*Plant. Med. Phytother.* 1977, *11*, 222; *Chem. Abstr.* 1978, *88*, 101599 z).

RICINUS (Euphorbiaceae)

R. communis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 348).

Fresh leaves protected against liver injury induced by carbon tetra chloride in rats while cold aqueous extract provided partial protection (*Indian J. Pharmacol.* 1977, *9*, 265).

Seed coat contained 1.50-1.62% lipids and higher amounts of phosphatides and non-saponifiable matter than seed kernel (*Izv. Vyssh. Uchebn. Zaved. Pishch. Tekhnol.* 1977, *147*; *Chem. Abstr.* 1977, *87*, 148702 x).

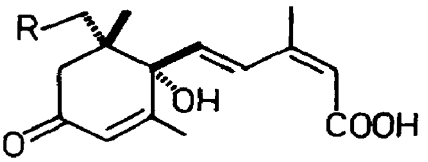
ROBINIA (Papilionaceae)

R. pseudoacacia L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 349).

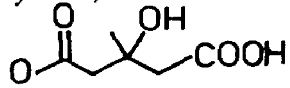
β-Sitosterol, its acetate, lupenone and lupeol isolated from roots (*Kagoshima Daigaku Rigakubu Kiyo Sugaku Butsuri Kagaku* 1972, 55; *Chem. Abstr.* 1973, *79*, 63562 m); detection of umbelliferone by TLC in flower (*Rev. Med.* 1974, *20*, 218; *Chem. Abstr.* 1975, *82*, 108867 v); kaempferol-3-O-β-D-galactopyranosyl-7-O-α-L-rhamnopyranoside isolated from flowers (*Fitokhim. Izuch. Flory BSSR Biofarm. Issled. Lek. Prep.* 1975, 77; *Chem. Abstr.* 1978, *89*, 20273 g);

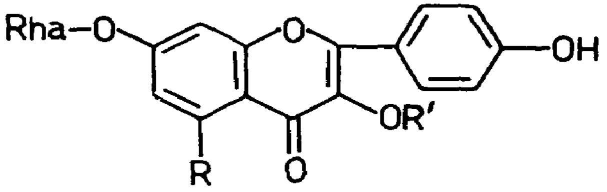
revised structure of robinin (*Conv. Int. Polifenoli* 1975, 98; *Chem. Abstr.* 1977, *86*, 106980 k); abscisic acid and its metabolite - β-hydroxy-β-methylglutaryl-hydroxyabscisic acid - isolated from seeds and their structures, determined (*Phytochemistry* 1978, *17*, 1625); detection of linoleic, linolenic, oleic, palmitic and stearic acids, sucrose and glucose in seed oil by GLC (*Arch. Pharm.* 1978, *28*, 129; *Chem. Abstr.* 1979, *90*, 69130 t); a flavonoid - rhamnorobin - isolated from flowers and characterised (*Punsok Hwahak* 1978, *16*, 107; *Chem. Abstr.* 1979, *90*, 183145 b); content of o-dihydroxyphenol derivatives (expressed as caffeic acid) in flowers determined as 0.14-0.16% and composed of caffeic acid, chlorogenic acid and two unidentified compounds (*Farmacia* 1978, *26*, 33, 177; *Chem. Abstr.* 1978, *89*, 87155 p; *ibid.* 1979, *90*, 36338 p).

NEW COMPOUNDS



Abscisic acid
R = H
β-Hydroxy-β-methylglutaryl-hydroxyabscisic acid

R = 



Robinin
R = OH, R' = Gal(1→6)Rha
Rhamnorobin
R,R' = H

BIOLOGICAL ACTIVITY

Robinin decreased blood urea level by 30% in rats at daily dose of 4 mg/kg for 13 days; during initial stage of experimentally induced azotemia, robinin restricted rise of blood urea level in about 50% of rats. Flower extract administered at the time of highest blood urea level in experimental azotemia, decreased the level (*Nauch. Tr. Vissh Veterinarnomed. Inst. Sofia* 1970, *22*, 229; *Chem. Abstr.* 1974, *80*, 43950 d); effect of flavones found to be almost as potent as that of rutoside on permeability of peritoneal capillaries in mice (*Farmacia* 1978, *26*, 161; *Chem. Abstr.* 1979, *90*, 48564 x).

RORIPA (Brassicaceae)

R. nasturtium-aquaticum (L.) Hayek syn. *Nasturtium fontanum* Aschers.,

N. officinale R. Br. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 174).

3-Phenylpropionitrile, phenethylisothiocyanate, 8-methylthiooctanonitrile and 9-methylthiononanonitrile isolated from seeds (*Phytochemistry* 1977, *16*, 907).

ROSA (Rosaceae)

R. chinensis Jacq.; see *R. indica* L.

R. damascena Mill. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 350).

β-Phenethyl-β-D-glucopyranoside (1.0%) isolated from flowers (*Dokl. Akad. Nauk SSSR* 1975, *223*, 1260; *Chem. Abstr.* 1976, *84*, 2203 b); detection of citronellol, nerol, geraniol and phenylethanol in essential oil by GC (*Dokl. Bolg. Akad. Nauk* 1977, *30*, 89; *Chem. Abstr.* 1977, *86*, 177158 j).

R. gallica L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 215).

β-Phenethyl-β-D-glucopyranoside, mp. 38°, isolated from flowers (*Khim. Prir. Soedin.* 1975, *11*, 807; *Chem. Abstr.* 1976, *84*, 102356 x); linalool, citronellol, nerol, geraniol and their glucosides found in petals (*Khim. Prir. Soedin.* 1977, *13*, 864; *Chem. Abstr.* 1978, *88*, 101592 s); gallicosides A,B and C isolated from flowers; gallicoside A contained oleanolic acid and glucose, B contained oleanolic acid, glucose and ribose, and C contained β-sitosterol, glucose and galactose (*Khim. Prir. Soedin.* 1977, *13*, 420; *Chem. Abstr.* 1977, *87*, 114657 w).

R. indica L. syn. *R. chinensis* Jacq. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 215).

Fatty acids C_{18} (10.7), C_{20} (81.6) and C_{22}(11.7%) present in seed oil (*Tokyo Gakugei Kiyo*, Dai-4-Bu 1972, *24*, 89; *Chem. Abstr.* 1972, *77*, 149711 e); gallic acid isolated from flowers (*Experientia* 1977, *33*, 207).

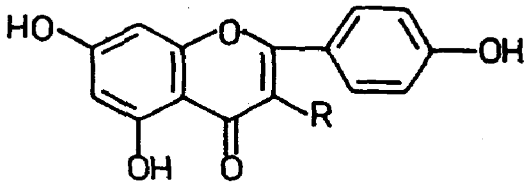
BIOLOGICAL ACTIVITY

Gallic acid at 3% concentration showed fungistatic property against *Alternaria*, *Fusarium* and *Aspergillus* species (*Experientia* 1977, *33*, 207).

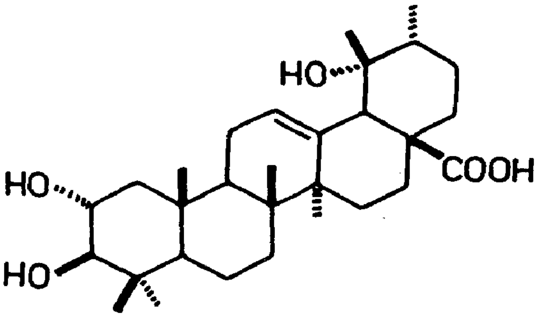
R. multiflora Thunb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 350).

Tormentic acid, mp. 266° (2α,19α-dihydroxyursolic acid) isolated from roots (*Chem. Pharm. Bull.* 1969, *17*, 2223); new glycosides - multiflorins A and B - isolated from fruits and characterised as kaempferol-3β-D-glucopyranosyl(1→4)-α-L-rhamnopyranoside monoacetate and kaempferol-3-β-D-glucopyranosyl(1→4)-α-L-rhamnopyranoside respectively; kaempferol-3α-L-rhamnopyranoside and methyl gallate also isolated (*Yakugaku Zasshi* 1976, *96*, 1217; *Chem. Abstr.* 1977, *86*, 13815 v); three quercetin glycosides - F_1 (quercetin-3-β-D-glucopyranosyl(1→4)-α-L-rhamnopyranoside), F_3 (quercetin-3-β-D-glucopyranosyl(1→6)–β-D-glucopyranosyl(1→4)-α-L-rhamnopyranoside) and F_5 (quercitrin) - isolated (*Yakugaku Zasshi* 1976, *96*, 284; *Chem. Abstr.* 1976, *84*, 176743 t).

NEW COMPOUNDS



Multiflorin A
R = Rha(2'' or 3''-Ac)(4→1)Glu
Multiflorin B
R = Rha(4→1)Glu



Tormentic acid

BIOLOGICAL ACTIVITY

Multiflorin A showed stronger purgative activity than multiflorin B (*Yakugaku Zasshi* 1976, *96*, 1217; *Chem. Abstr.* 1977, *86*, 13815 v).

ROSMARINUS (Lamiaceae)

R. officinalis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 350).

Royleanone, its 7α-hydroxy and 7α-acetoxy derivatives and 6,7-dehydroroyleanone isolated from roots (*Planta Med.* 1973, *24*, 190); detection of 3-octanone in essential oil of leaves by GC (*Z. Naturforsch.* 1978, *33*C, 144; *Chem. Abstr.* 1978, *88*, 141489 v).

BIOLOGICAL ACTIVITY

Rosmaricine HCl was only slightly toxic when given internally or s.c. to mice, rats and rabbits. A 15 mg/kg dose decreased the strength of conditioned reflex in rats and electrical activity of rabbit cerebral cortex (*Tr. Vses. Nauch. Issled. Inst. Lek. Rast.* 1971, *14*, 129; *Chem. Abstr.* 1973, *79*, 27314 y).

ROTALA (Lythraceae)

R. floribunda (Clarke) Koenhe syn. *Ammania floribunda* Clarke

Betulinic acid isolated (*Indian J. Chem.* 1977, *15*B, 291).

Distribution : Mahabaleshwar in Western Ghats.

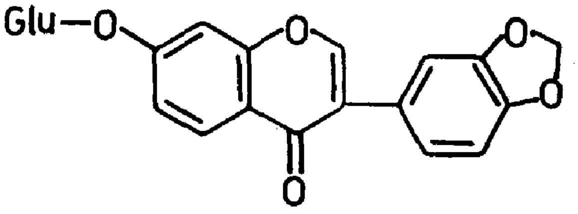
ROTHIA (Papilionaceae)

R. indica (L.) Druce syn. *R. trifoliata* (Roth) Pers.

A new isoflavone glucoside - rothindin - isolated and characterised as pseudobaptigenin-7-O-β-D-glucopyranoside (*Indian J. Chem.* 1976, *14*B, 801; *Pharmazie* 1978, *33*, 235; *Chem. Abstr.* 1978, *89*, 110264 j); synthesis of rothindin (*Pharmazie* 1978, *33*, 235; *Chem. Abstr.* 1978, *89*, 110264 j).

Distribution : In dry regions, from Madhya Pradesh southwards to peninsular India.

NEW COMPOUNDS



Rothindin

R. trifoliata (Roth) Pers.; see *R. indica* (L.) Druce

ROUREA (Connaraceae)

R. acuminata Hook.f.; see *R. minor* (Gaertn.) Alston

R. caudata Planch.; see *R. minor* (Gaertn.) Alston

R. minor (Gaertn.) Alston syn. *Santaloides minus* Schellenb., *Rourea santaloides* (Vahl) W. & A., *R. caudata* Planch., *R. pulchella* Planch., *R. acuminata* Hook.f. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 215 & 221).

Roots widely used in Ayurvedic medicine for rheumatism and pulmonary complaints.

β-Sitosterol-β-D-glucoside, hentriacontane and meso-inositol isolated from roots (*Curr. Sci.* 1969, *38*, 495); rapanone, leucopelargonidin and β-sitosterol from roots (*J. Inst. Chemists,* Calcutta 1976, *48*, 196; *Chem. Abstr.* 1977, *86*, 68377 j).

R. pulchella Planch.; see *R. minor* (Gaertn.) Alston

R. santaloides (Vahl) W. & A.; see *R. minor* (Gaertn.) Alston

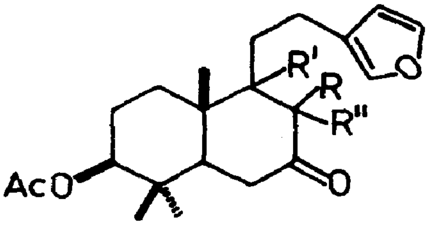
ROYLEA (Lamiaceae)

R. calycina (Roxb.) Briq.; see *R. cineria* (D. Don) Baillon

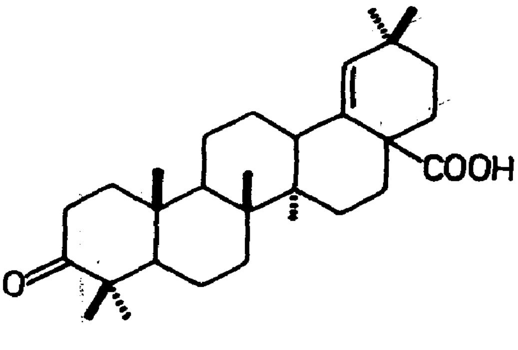
R. cineria (D. Don) Baillon syn. *R. elegans* Wall., *R. calycina* (Roxb.) Briq. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 215).

Betulin, β-amyrin, β-sitosterol, stigmasterol, cetyl alcohol, glucose, fructose, arabinose and palmitic, stearic, oleic, gallic, oxalic and tartaric acids isolated from leaves (*Herba Pol.* 1979, *25*, 95; *Chem. Abstr.* 1979, *91*, 189829 v); structure of moronic acid confirmed (*J. Org. Chem.* 1979, *44*, 2811); calyone, calyenone and precalyone isolated and their structures elucidated (*J. Chem. Soc.* Perkin 1 1979, 1305).

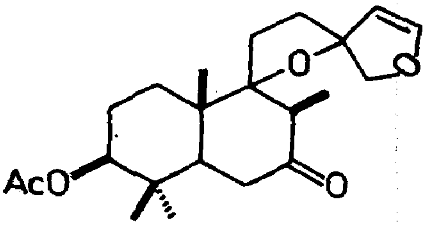
NEW COMPOUNDS



Calyone
R = H, R' = OH, R'' = β-Me
Calyenone
RR' = Δ, R'' = Me



Moronic acid



Precalyone

BIOLOGICAL ACTIVITY

Precalyone showed antitumour activity against lymphocytic leukaemia (P-388) in mice (*J. Chem. Soc.* Perkin 1 1979, 1305).

R. elegans Wall.; see *R. cineria* (D. Don) Baillon

RUBIA (Rubiaceae)

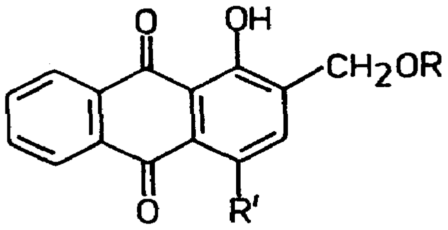
R. cordifolia L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 215).

Alizarin and its glucoside present in plant (*Phytochemistry* 1972, *11*, 1524).

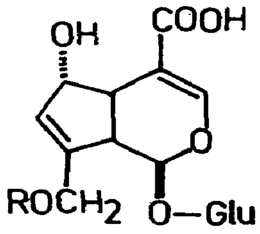
R. tinctorum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 351).

A new anthraquinone derivative - christofin (1,4-dihydroxy-2-ethoxymethylanthraquinone) - isolated (*Pharmazie* 1974, *29*, 478; *Chem. Abstr.* 1975, *82*, 54163 s); alizarin (0.24), purpurin (0.095), purpurin carboxylate, quinizarine (0.13%) and christofin isolated from roots along with two new anthraquinones - 1,4-dihydroxy-2-hydroxymethylanthraquinone and 1-hydroxy-2-hydroxymethylanthraquinone (*Pharmazie* 1975, *30*, 330; *Chem. Abstr.* 1975, *83*, 190341 i); new iridoid glucosides - asperulosidic and 10-deacetylasperulosidic acids - isolated (*Gazz. Chim. Ital.* 1978, *108*, 13; *Chem. Abstr.* 1978, *89*, 160093 y).

NEW COMPOUNDS



Christofin
R = Et, R' = OH
1,4-Dihydroxy-2-hydroxymethyl-anthraquinone
R = H, R' = OH
1-Hydroxy-2-hydroxymethylanthraquinone
R,R' = H



10-Deacetylasperulosidic acid
R = H
Asperulosidic acid
R = Ac

RUBUS (Rosaceae)

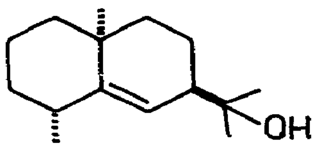
R. fruticosus L.; see *R. ulmifolius* Schott

R. indotibetanus Koidzumi syn. *R. rosaefolius* (*rosifolius*) auct. (non Smith) p.p.
Khasi - Soh-depai.

Isolation of rosifoliol, along with bicyclogermacrene and pregeijerene, from oil and its structure elucidation (*Tetrahedron Lett.* 1977, 873; *Aust. J. Chem.* 1978, *31*, 2527); β-caryophyllene, humulene, dihydroagarofuran and hedycaryol also isolated (*Aust. J. Chem.* 1978, *31*, 2527).

Distribution : Himalayas, from Nepal to Bhutan, alt. 1200-2100 m and Meghalaya, alt. 1500-1700 m.

NEW COMPOUNDS



Rosifoliol

R. moluccanus L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 352).

Tormentic acid isolated from leaves (*J. Indian Chem. Soc.* 1979, *56*, 323).

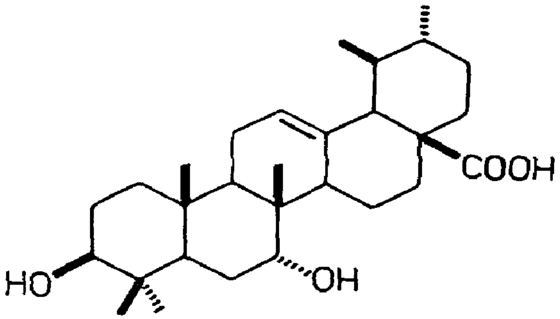
R. rosaefolius (*rosifolius*) Smith; see *R. indotibetanus* Koidzumi

R. ulmifolius Schott syn. *R. fruticosus* L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 216).

Rubitic acid isolated and its structure determined (*Chem. Ind.* 1970, 869; *Phytochemistry*

1978, *17*, 1983); sitosterol, stigmasterol, β-amyrin, ursonic acid and 2α-hydroxyursolic acid isolated (*Phytochemistry* 1972, *11*, 2893).

NEW COMPOUNDS



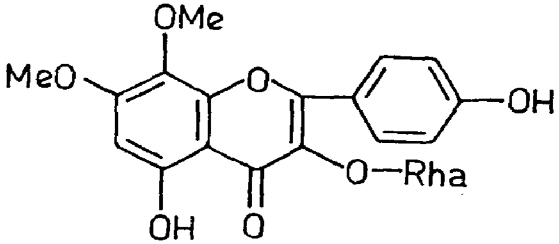
Rubitic acid

RUDBECKIA (Asteraceae)

R. bicolor Nutt. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 352).

Isolation of a new flavonol glycoside and its characterisation as 7,8-di-O-methylherbacetin-3-rhamnoside (*Phytochemistry* 1979, *18*, 359).

NEW COMPOUNDS



7,8-Di-O-methylherbacetin-3-rhamnoside

RUELLIA (Acanthaceae)

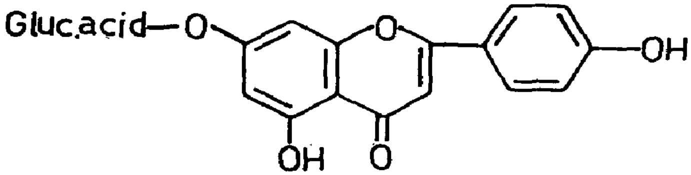
R. prostrata Poir.; see *Dipteracanthus prostratus* (Poir.) Nees

R. tuberosa L.

Isolation of apigenin-7-β-D-glucuronide and its synthesis (*Chem. Ber.* 1971, *104*, 2681).

Distribution : Native of Central America, now naturalised in India and grown as ornamental.

NEW COMPOUNDS



Apigenin-7-β-D-glucuronide

RUMEX (Polygonaceae)

R. acetosa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 352).

Chrysophanol, aloe-emodin, emodin, physcion, 8-O-β-D-glucosylchrysophanol, 8-O-β-D-glucosylemodin and two new hydroxyanthraquinones isolated from roots; one of these characterised as ω-acetoxy-aloe-emodin (*Indian J. Chem.* 1977, *15*B, 884).

R. conglomeratus Murr. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 353).

Eriodictyol, naringenin, hesperetin and 5,7-dihydroxycoumarin isolated from fruits (*An. Quim.* 1978, *74*, 1570; *Chem. Abstr.* 1979, *91*, 52693 b).

R. crispus L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 216).

Chrysophanol, emodin and β-sitosterol isolated (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 147).

R. dentatus L.; see *R. dentatus* L. ssp. *klotzschianus* (Meissn.) Rech.f.

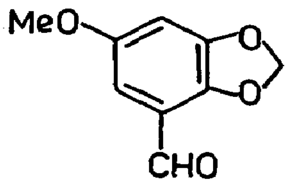
R. dentatus L. ssp. *klotzschianus* (Meissn.) Rech.f. syn. *R. dentatus* auct. (non L.) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 216).

Myricyl alcohol, β-sitosterol, its glucoside, emodin, aloe-emodin and quercetin isolated (*J. Indian Chem. Soc.* 1977, *54*, 1200).

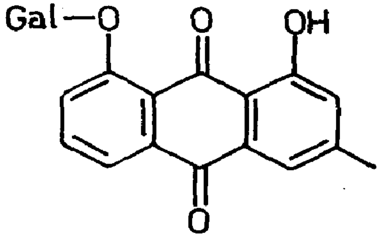
R. nepalensis Spreng. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 216).

Chrysophanol, emodin, physcion, lupeol, sitosterol, its glucoside, musizin-1-O-β-D-glucopyranoside, orientalone and two new compounds - 3-methoxy-5,6-methylenedioxybenzaldehyde (I) and chrysophanol-8-O-β-D-galactopyranoside - isolated from roots (*J. Indian Chem. Soc.* 1976, *53*, 1158; *Indian J. Chem.* 1978, *16*B, 289).

NEW COMPOUNDS



I



Chrysaphanol-8-O-β-D-galactopyranoside

R. orientalis Bernh.; see *R. patientia* L. ssp. *orientalis* (Bernh.) Danser

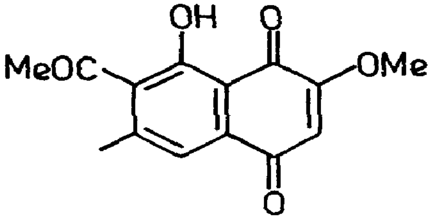
R. patientia L. ssp. *orientalis* (Bernh.) Danser syn. *R. orientalis* Bernh.

Eng. - Patience dock.

A new naphthaquinone - orientalone (6-acetyl-5-hydroxy-3-methoxy-7-methyl-1,4-naphthaquinone) - isolated along with musizin, chrysophanol, frangula emodin, aloe-emodin, physcion and β-sitosterol *(Indian J. Chem.* 1977, *15B*, 544; *Farm Obz.* 1978, *47*, 195; *Chem. Abstr.* 1978, *89*, 211983 y); neopodin, tricosanol and emodin isolated from roots (*J. Indian Chem. Soc.* 1978, *55*, 292).

Distribution : Western Himalayas, Kashmir to Kumaon, alt. 1800- 2700 m.

NEW COMPOUNDS



Orientalone

R. vesicarius L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 216).

Detection of cystine, glutamic acid, proline, phenylalanine and histidine by PC in protein extract (*Vijnana Parishad Anusandhan Patrika* 1977, *20*, 65; *Chem. Abstr.* 1978, *88*, 19010 s).

RUSSELIA (Scrophulariaceae)

R. multiflora Sims; see *R. sarmentosa* Jacq.

R. sarmentosa Jacq. syn. *R. multiflora* Sims

Peonidin-3-glucoside isolated from flowers (*Vijnana Parishad Anusandhan Patrika* 1978, *21*, 177; *Chem. Abstr.* 1979, *90*, 183171 g).

Distribution : Tropical American plant, grown in Indian gardens.

RUTA (Rutaceae)

R. chalepensis L. syn. *R. graveolens* L. var. *angustifolia* Hook.f.

H. - Pismarum, Sadab; B. - Ermul, Ispunol; Mar. & Guj. - Satapa; Tel. - Arudu, Serdapa; Tam. - Aruvadam chedi, Arvada ; Mal. - Nagadhali; Kan. - Nagadali soppu, Simesdanu.

Rutamarin, kokusaginine, xanthotoxin, chalepensin and skimmianine isolated (*An. Quim.* 1974, *70*, 60; *Chem. Abstr.* 1974, *80*, 130487 b).

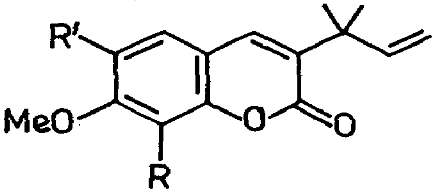
Distribution : Indigenous to south Europe and north Africa, cultivated in India.

R. graveolens L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 354).

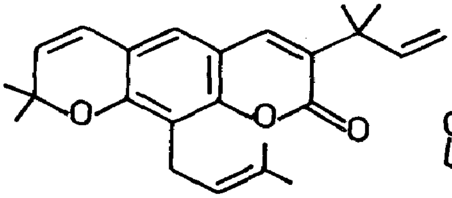
Three quaternary alkaloids - ribalinium, rutalinium and N-methylplatydesmin - isolated and their structures determined (*Herba Hung.* 1969, *8*, 127, 133; *Chem. Abstr.* 1970, *72*, 129395 y, 129396 z; *Herba Hung.* 1971, *10*, 131; *Chem. Abstr.* 1973, *79*, 15853 k); 3-(1,1-dimethylallyl)daphnetin dimethyl ether (I), 8-methoxygravelliferon, 3(1,1-dimethyl)-8-(3,3-dimethylal-

lyl) xanthyletin (II) and 1-(4,4-dimethylhexen-5-yl)-3,4-methylenedioxybenzene (III) isolated from roots and their structures determined (*Tetrahedron Lett.* 1970, 4305);biosynthesis of psoralen, bergapten and xanthotoxin (*Herba Hung.* 1971, *10*, 71; *Chem. Abstr.* 1973, *79*, 15686 r); a new coumarin - suberenone - isolated from roots and characterised as 6-(trans-1-buten-3-onyl)-7-methoxycoumarin (*Magy. Kem. Foly.* 1972, *78*, 6; *Chem. Abstr.* 1972, *76*, 138149 f); gravacridon-chlorine and gravacridonol-chlorine isolated from roots (*Phytochemistry* 1972, *11*, 2359); gravacridonediol and its monomethyl ether isolated from roots (*Phytochemistry* 1972, *11*, 2121); rutacultin, mp. 104°, isolated from roots along with rutamarin alcohol, mp. 165° (*Phytochemistry* 1972, *11*, 1529; *Herba Hung.* 1972, *11*, 13; *Chem. Abstr.* 1973, *79*, 102812 q); marmesin and marmesinin also isolated (*Herba Hung.* 1972, *11*, 13; *Chem. Abstr.* 1973, *79*, 102812 q; *Herba Hung.* 1974, *13*, 39: *Chem. Abstr.* 1975, *83*, 40168 f); psoralen (0.0126), bergapten (0.0514) and xanthotoxin (0.127%) isolated (*Atti Ist. Veneto Sci. Lett. Arti, Cl. Sci. Mat. Nat.* 1973, *131*, 17: *Chem. Abstr.* 1975, *83*, 175438 q); daphnorin and scopoletin isolated from roots (*Herba Hung.* 1974, *13*, 39; *Chem. Abstr.* 1975, *83*, 40168 f); bergapten, isoimperatorin, psoralen, pangelin, kokusaginine, rutamine and rutamarin isolated (*An. Quim.* 1974, *70*, 60; *Chem. Abstr.* 1974, *80*, 130487 b); structure of isorutarin confirmed (*Fitoterapia* 1976, *47*, 107); gravacridonediol and gravacridonetriol, mp. 230°, isolated from roots (*Phytochemistry* 1976, *15*, 240); furacridone, 1-hydroxy-3-methoxy-N-methylacridone (IV) and isogravacridone-chlorine isolated from roots; their structures determined (*Phytochemistry* 1977, *16*, 151); detection of tridecan-2,4-dione, heptadecan-2,4-dione, α-pinene, sabinene, myrcene, caryophyllene, trans-α-bergamotene, β-elemene, β-cyclocitral, β-phenylethyl butanoate, cis- and trans-cinnamyl isovalerate in essential oil by GLC (*Pharm. Weekbl.* 1978, *113*, 1169; *Chem. Abstr.* 1979, *90*, 127380 n); structure of rutacridone isolated from roots (*Z. Naturforsch.* 1978, *33*B, 957; *Chem. Abstr.* 1978, *89*, 197765 v).

NEW COMPOUNDS



Rutacultin
R = H, R' = OMe
I
R = OMe, R' = H



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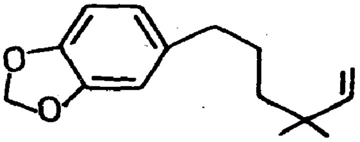
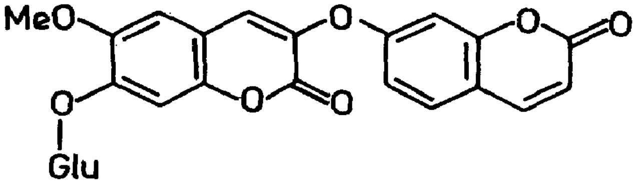
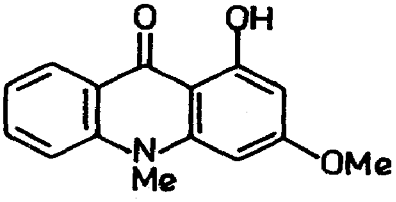


III



Daphnorin



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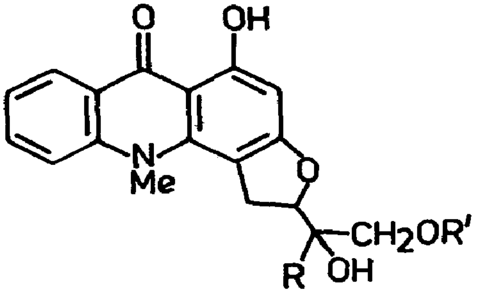
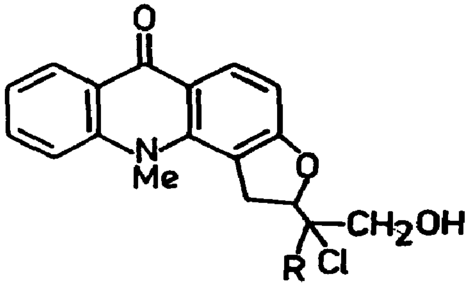
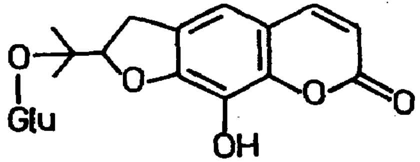


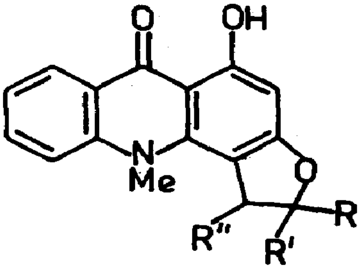
Gravacridonediol methylether
R R′ = Me
Gravacridonediol
R = Me, R′ = H
Gravacridonetriol
R = CH_2OH, R′ = H



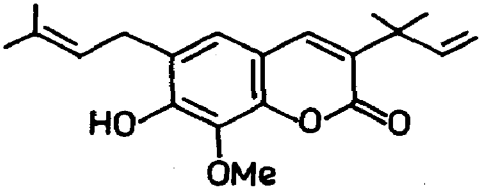
Gravacridone-chlorine
R = Me
Gravacridonol-chlorine
R = CH_2OH



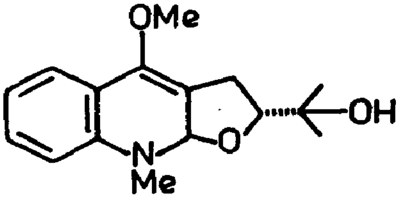
Isorutarin



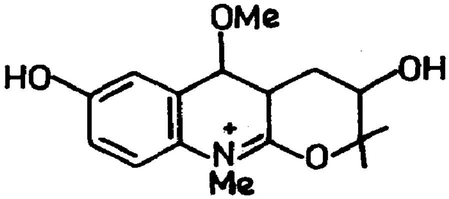
Furacridone
R = H, R′,R″ = Δ
Isogravacridone-chlorine
R = , R′ R″ = H



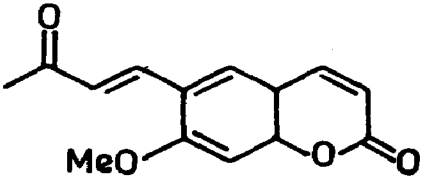
8-Methoxygravelliferone



N-Methylplatydesmin



Rutalinium



Suberenone

SACCHARUM (Poaceae)

S. bengalense Retz. syn. ***S. ciliare*** Anders., ***S. munja*** Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 217).

Alcoholic extract showed negative inotropic and chronotropic effects (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 145).

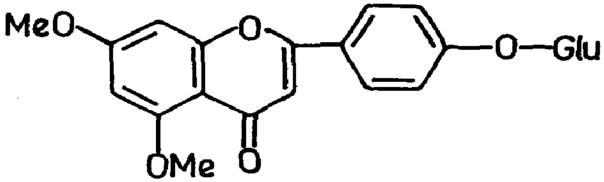
S. cilare Anders.; see *S. bengalense* Retz.

S. munja Roxb.; see *S. bengalense* Retz.

S. officinarum L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 217).

5-O-Methylapigenin and 3',4',5,7-tetrahydroxy-3,6-dimethoxyflavone isolated from flowers (*Indian J. Chem.* 1979, *18*B, 88); 5,7-O-dimethylapigenin-4'-O-β-D-glucopyranoside (I) isolated from leaves and characterised (*Curr. Sci.* 1978, *47*, 152).

NEW COMPOUNDS



I

S. spontaneum L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 217).

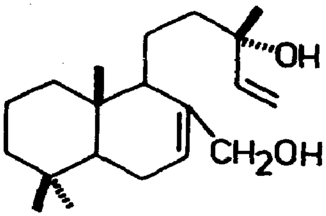
Alcoholic extract of rhizomes and roots showed significant diuretic activity at a dose of 500 mg/kg in rats (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 145).

SAGITTARIA (Alismataceae)

S. sagittifolia L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 218).

Hentriacontanone and sitosterol isolated (*Phytochemistry* 1972, *11*, 2621); a new diterpene - sagittariol - isolated and characterised as labda-7,14-dien-13(S),17-diol (*Phytochemistry* 1975, *14*, 1055).

NEW COMPOUNDS



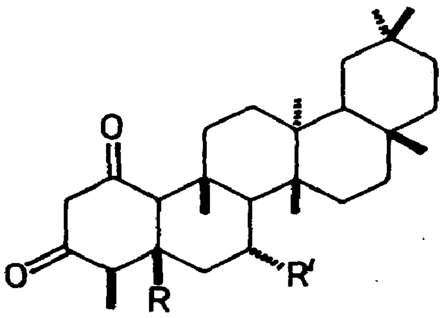
Sagittariol

SALACIA (Celastraceae)

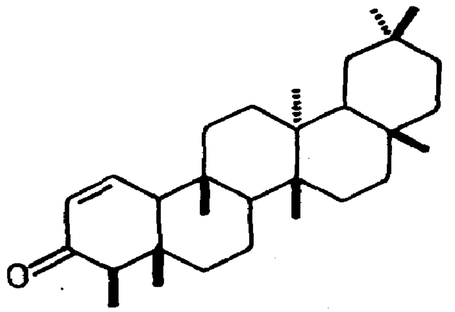
S. chinensis L. syn. *S. prinoides* DC., *S. latifolia* Wall. ex Laws. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 356).

Friedel-1-en-3-one, friedelan-1,3-dione-7α-ol and friedelan-1,3-dione-24-al isolated (*Curr. Sci.* 1971, *40*, 601; *Tetrahedron* 1973, *29*, 1365; *J. Chem. Soc.* Perkin 1 1974, 146); friedelan-1,3-dione, friedelan-1,3-dione-24-ol, friedelan-1,3-dione-24-oic acid and 24,25-oxidofriedelan-1,3-dione isolated from root bark and characterised (*Tetrahedron* 1973, *29*, 1365); 7,24-oxido-friedelan- 1,3-dione isolated from root bark and characterised (*Indian J. Chem.* 1973, *11*, 1334); crystal structure of another new triterpene - 25,26-oxidofriedelan-1,3-dione (*Tetrahedron Lett.* 1974, 63).

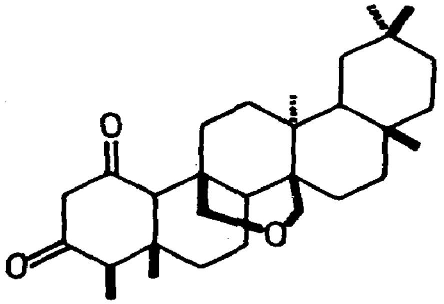
NEW COMPOUNDS



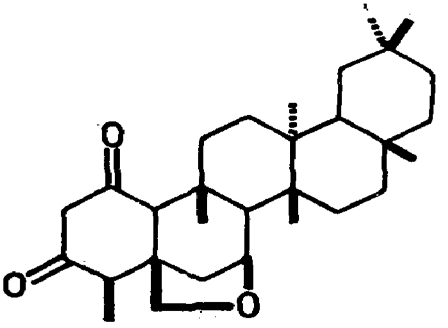
Friedelan-1,3-dione-7α-ol
R = Me, R' = OH
Friedelan-1,3-dione-24-al
R = CHO, R' = H
Friedelan-1,3-dione-24-oic acid
R = COOH, R' = H
Friedelan-1,3-dione-24-ol
R = CH_2OH, R' = H



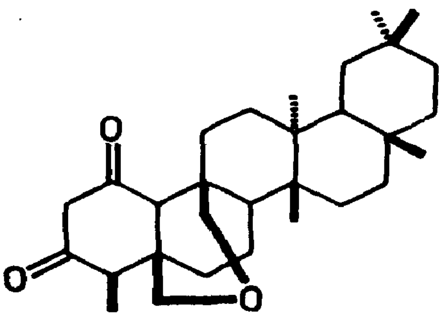
1-Friedel-1-en-3-one



25,26-Oxidofriedelan-1,3-dione



7,24-Oxidofriedelan-1,3-dione



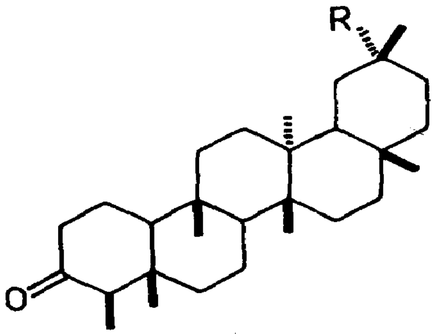
24,25-Oxido-friedelan-1,3-dione

S. fruticosa Heyne

New triterpenes - friedelan-3-one-29-al and friedelan-3-one-29-ol - isolated from root bark and characterised; isolation of friedelin, friedel-1-en-3-one, α-amyrin and sitosterol (*Indian J. Chem.* 1975, *13*, 342).

Distribution : Western Peninsula.

NEW COMPOUNDS



Friedelan-3-one-29-al
R = CHO
Fridelan-3-one-29-ol
R = CH_2OH

S. latifolia Wall. ex Laws.; see *S. chinensis* L.

S. macrosperma Wight

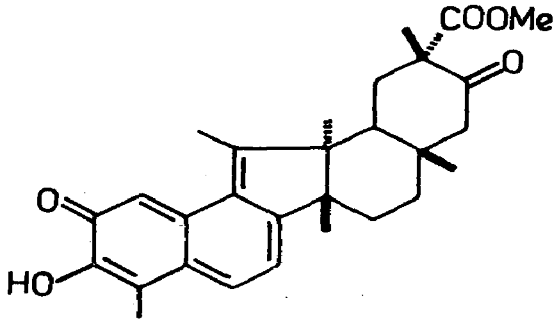
Mar. - Lendphal; Mal. - Anakoranti.

Extracts of leaves and roots produced hypoglycaemia at a dose of 1 g/kg in rabbits, the average fall being 24.3 and 20.9% respectively (*J. Res. Indian Med.* 1973, *8*, 17).

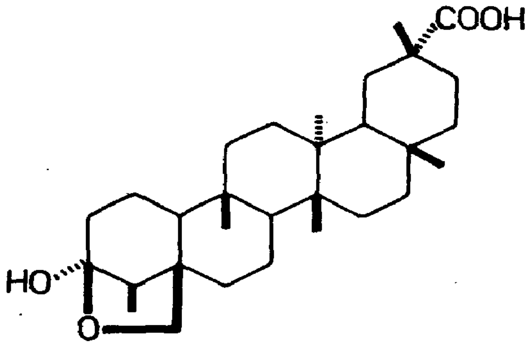
Three quinones - saptarangi quinones A, B and C - isolated from root bark and partial structure assigned to saptarangi quinone A (*Indian J. Chem.* 1971, *9*, 117); a new compound - salacia quinonemethide - isolated from root bark along with pristimerin, tingenone and hydroxytingenone (*Indian J. Chem.* 1976, *14*B, 131); a new triterpene - salaspermic acid - isolated and its structure determined (*J. Chem. Soc.* Perkin 1 1979, 349).

Distribution : Western Ghats from Konkan southwards.

NEW COMPOUNDS



Salacia quinonemethide



Salaspermic acid

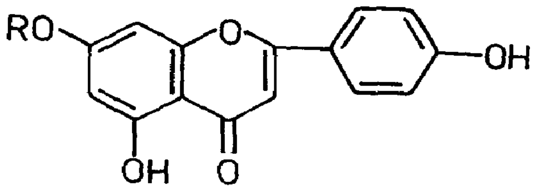
S. prinoides DC.; see *S. chinensis* L.

SALIX (Salicaceae)

S. alba L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 357).

A linear glucomannan consisting of 32 units of glucopyranose and mannopyranose bound by (1→4) glycosidic linkages in ratio of 1:1.4 isolated from bark (*Collect. Czech. Chem. Commun.* 1972, *37*, 3640); another linear glucomannan consisting of about 20 (1→4) linked glucose and mannose units in ratio of 1:1.4 and a photoglycogen type α-glucan isolated from bark (*Collect. Czech. Chem. Commun.* 1975, *40*, 1240); apigenin-7-O-(4''-p-coumaroyl) glucoside and terniflorin isolated from leaves; latter was an artefact and 6-isomer of former; in addition quercetin-3-O-glucoside, quercetin-3-O-rutinoside, isorhamnetin-3-O-glucoside, isorhamnetin-3-O-rutinoside and 7,3'-O-dimethylquercetin-3-O-glucoside isolated (*Phytochemistry* 1976, *15*, 1084).

NEW COMPOUNDS

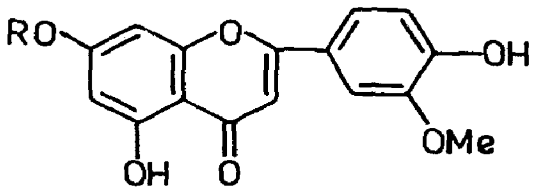


Apigenin-7-O-(4''-p-coumaroyl)glucoside
R = Glu(4''-p-coumaryl)

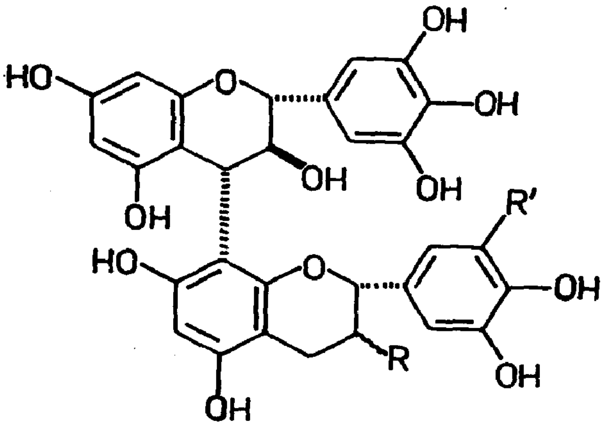
S. caprea L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 218).

A new flavone bioside - salicaprene, mp. 245° - isolated and characterised as chrysoeriol-7[2-α-arabinofuranosyl]-β-D-galactopyranoside (*Khim. Farm. Zh.* 1970, *4*, 40; *Chem. Abstr.* 1970, *73*, 22133 e); luteolin-7-β-D-glucopyranoside isolated from leaves (*Khim. Prir. Soedin.* 1972, *8*, 392; *Chem. Abstr.* 1972, *77*, 162006 y); (+)epigallocatechin and (+)gallocatechin dimers, I and II, isolated from leaves (*J. Chem. Soc.* Perkin 1 1978, 1186).

NEW COMPOUNDS



Salicaprene
R = Gal(2→1)Ara



Dimer I
R = α-OH, R′ = β-OH
Dimer II
R = β-OH, R′ = H

S. viminalis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 358).

Isorhamnetin-3-O-(6′′-acetyl)glucoside, apigenin-7-O-glucoside, isorhamnetin-3-O-glucoside and isoquercitrin isolated from leaves (*Phytochemistry* 1977, *16*, 1117).

SALMALIA (Bombacaceae)

S. malabarica (DC.) Schott & Engl.; see *Bombax cieba* L.

SALVADORA (Salvadoraceae)

S. indica Wight; see *S. persica* L. var. *wightiana* (Planch. ex Thw.) Verdc.

S. oleoides Decne. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 219).

Dibenzylurea, dibenzylthiourea and stigmasterol from fruits (*Indian J. Chem.* 1977, *15B*, 291).

S. persica L. var. *wightiana* (Planch. ex Thw.) Verdc. syn. *S. indica* Wight, *S. persica* auct. (non L.) (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 219).

Plant extract showed antibacterial, weak anti-inflammatory and mild hypoglycaemic activities (*Planta Med.* 1979, *34*, 191).

β-Sitosterol and elemental γ-monoclinic sulphur (S8) isolated from roots (*Planta Med.* 1979, *34*, 191).

S. persica L.; see *S. persica* L. var. *wightiana* (Planch. ex Thw.) Verdc.

SALVIA (Lamiaceae)

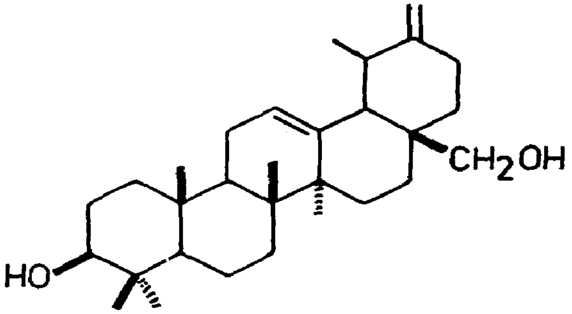
S. coccinea L.

Eng. - Salvia.

n-Hentriacontanol, β-sitosterol and an unidentified triterpene, mp. 210°, isolated (*J. Indian Chem. Soc.* 1978, *55*, 292); dehydrouvaol and uvaol isolated along with β-sitosterol and their structures determined (*J. Indian Chem. Soc.* 1978, *55*, 850).

Distribution : Grown in gardens.

NEW COMPOUNDS



Dehydrouvaol

S. lanata Roxb.; see *S. mukerjeea* Bennet & Raizada

S. leucantha Cav.

A new triterpene - 3-epierythrodiol - along with β-amyrin, β-sitosterol and hentriacontane isolated (*Curr. Sci.* 1979, *48*, 107).

Distribution : Native of Mexico, grown in Indian gardens.

S. mukerjeea Bennet & Raizada syn. *S. lanata* Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 219).

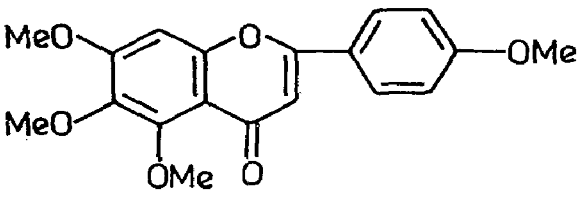
1,8-Cineole and p-cymene identified as major components in essential oil (*Indian Perfum.* 1977, *22*, 129; *Chem. Abstr.* 1978, *89*, 152564 n); 1,8-cineole, p-cymene, α-terpinene, β-thujone, citronellal, linalool, linalyl acetate, citral, citronellol, geraniol, d-nerolidol, β-santalene and γ-cadinene present in essential oil of flowers (*Indian J. Chem.* 1977, *15B*, 498).

S. officinalis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 358).

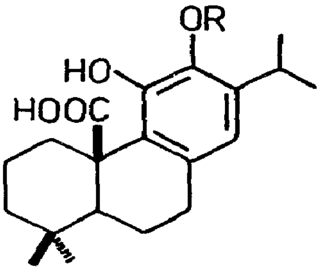
Genkwanin, 6-methoxygenkwanin, luteolin, 6-methoxyluteolin and its 7-methyl ether and hispidulin from leaves (*Arch. Pharm.* 1971, *304*, 557; *Chem. Abstr.* 1971, *75*, 148543 y); royleanone, its 7α-hydroxy and acetoxy derivatives as well as 6,7-dehydroroyleanone isolated from roots (*Planta Med.* 1973, *24*, 190); salvin and its monomethyl ether isolated from flowers and their structures elucidated (*Khim. Prir. Soedin.* 1976, *12*, 686; *Chem. Abstr.* 1977, *86*, 117603 r); essential oil contained salvin, α-pinene, β-pinene, camphor, myrcene, cineole and α-thujone; total ketone content of essential oil was 62.05%, of which thujone constituted 61.63% (*Glas. Hem. i Tehnol. Bosne. i Hercegovine* 1977, *23*, 25; *Chem. Abstr.* 1978, *89*,

160184 d); C_{16} (saturated) and $C_{18:2}$ (unsaturated) acids as main fatty acids found in seed oil along with β-sitosterol (91.3% of total sterol fraction) (*Tokyo Gakugei Daigaku Kiyo, Dai-4-Bu* 1978, *30*, 77; *Chem. Abstr.* 1979, *90*, 200316 c); a new flavone - 5-methoxysalvigenin, mp. 166° - isolated from leaves (*Planta Med.* 1979, *35*, 376).

NEW COMPOUNDS



5-Methoxysalvigenin



Salvin
R = H
Salvin monomethyl ether
R = Me

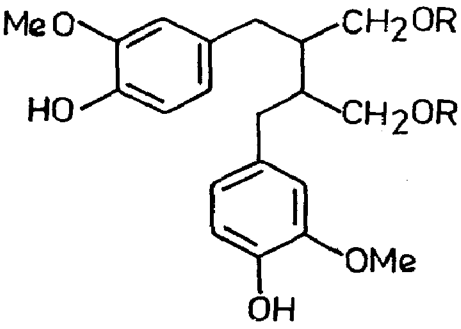
BIOLOGICAL ACTIVITY

Salvin and its monomethyl ether exhibited significant activity against *Staphylococcus aureus* (*Khim. Prir. Soedin.* 1976, *12*, 686; *Chem. Abstr.* 1977, *86*, 117603 r).

S. plebeia R. Br. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 219).

Four flavonoids - 4′,5-dihydroxy-6-methoxy-7-(glucosyloxy)-flavone, 4′,5,7-trihydroxy-6-methoxyflavone, 3′,4′,5-trihydroxy-6-methoxy-7-(glucosyloxy)flavone and 3′,4′,5,7-tetrahydroxy-7-methoxyflavone (*J. Chinese Chem. Soc.* 1972, *19*, 131; *Chem. Abstr.* 1972, *77*, 161935 p); a new lignan diester isolated from seeds which on hydrolysis yielded 12-methyl-tetradecanoic acid and secoisolariciresinol (*Phytochemistry* 1978, *17*, 149).

NEW COMPOUNDS



Secoisolariciresinol di-12-methyl-tetradecanoate
R = Tetradecanoyl-12-Me

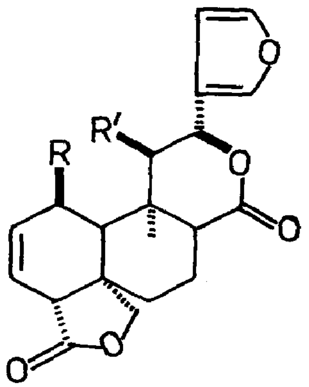
S. splendens Ker-Gawl.

H.- Salvia, Eng.- Scarlet sage.

A new trans-clerodane - splendidin - isolated and its structure determined (*J. Chem. Soc.* Perkin 1 1979, 533); crystal structure of a new diterpene - salviarin - isolated from leaves (*J. Chem. Soc.* Perkin 1 1978, 643).

Distribution : Native of Brazil, grown in Indian gardens.

NEW COMPOUNDS



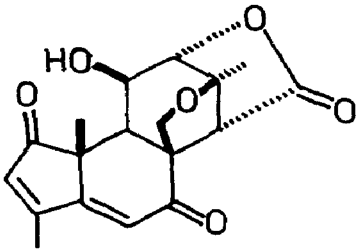
Salviarin
R,R' = H
Splendidin
R,R' = OAc

SAMADERA (Simaroubaceae)

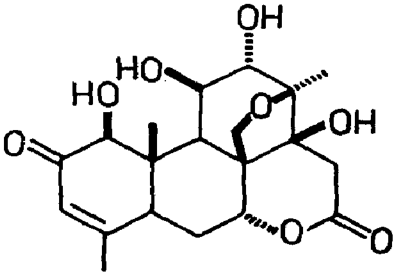
S. indica Gaertn. syn. *S. lucida* Wall., *Quassia indica* (Gaertn.) Nooteb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 359).

Crystal structure of samaderine A; isolation of another quassinoid - samaderine E - and its structure elucidation (*Chem. Commun.* 1977, 295; *J. Chem. Res.* (S) 1978, 14; *Chem. Abstr.* 1978, *88*, 191141 w).

NEW COMPOUNDS



Samaderine A



Samaderine E

BIOLOGICAL ACTIVITY

Samaderine E showed antileukaemic activity (*Chem. Commun.* 1977, 295).

S. lucida Wall.; see *S. indica* Gaertn.

SAMANEA (Mimosaceae)

S. saman (Jacq.) Merr. syn. *Enterolobium saman* (Jacq.) Prain ex King, *Pithecellobium* (*Pithecolobium*) *saman* (Jacq.) Benth.

B. - Belayti siris; Tam. - Thungumoonji; Tel. - Nidraganneru; Eng. - Rain tree.

Octacosanoic acid, lupeol, α-spinasterol, α-spinasterone and lupenone isolated from bark (*Phytochemistry* 1971, *10*, 1954); a new saponin - samanin B - shown to be constituted of acacic acid and glucose, arabinose, xylose and rhamnose present in molar ratio of 4:2:1:1 (*J. Indian Chem. Soc.* 1977, *54*, 992); another new saponin - samanin C, mp. 146° - isolated from wood and found to contain acacic acid along with glucose, arabinose, xylose, fucose and rhamnose in molar ratio of 6:1:2:3:4 (*Indian J. Pharm.* 1977, *39*, 80); a new saponin - samanin D - isolated from flowers contained acacic acid along with glucose, arabinose, xylose and rhamnose in ratio of 5:4:3:1 (*Indian J. Pharm. Sci.* 1978, *40*, 66).

Distribution : Native of tropical America, planted in India as ornamental shade tree on roadsides.

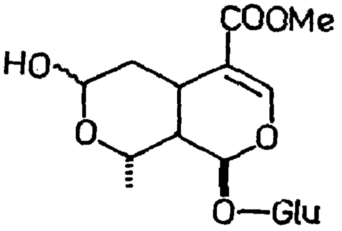
SAMBUCUS (Caprifoliaceae)

S. ebulus L.; see *S. wightiana* Wall. ex Wt. & Arn.

S. nigra L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 359).

Rutin, glucose, fructose and sucrose found in plant (*Egypt. J. Pharm. Sci.* 1972, *13*, 95; *Chem. Abstr.* 1974, *80*, 35084 j); cyanogenic glucosides - prunasin, holocalin and zierin - isolated (*Acta Chem. Scand.* 1973, *27*, 2661); oil from flowers contained fatty acids (66.0%) constituted mainly of palmitic (37.9), linolenic (20.1), linoleic (19.6) and oleic (8.5%) acids; it also contained alkanes (7.2%) mainly constituted of C_{19}, C_{21}, C_{23} and C_{25} alkanes (*Deut. Apoth. Ztg.* 1974, *114*, 947; *Chem. Abstr.* 1974, *81*, 101809 y); an iridoid glucoside - morroniside - isolated from young shoots (*Phytochemistry* 1974, *13*, 517); sitosterol, stigmasterol, campesterol, α-amyrin and β-amyrin palmitates, ursolic and oleanolic acids and quercetin found in leaves (*Phytochemistry* 1975, *14*, 1871); α- and β-amyrins, lupeol, cycloartenol, 24-methylenecycloartanol, cycloeuclenol, cholesterol, campesterol and stigmasterol found in free as well as esterified forms in flowers (*Planta Med.* 1978, *31*, 328).

NEW COMPOUNDS



Morroniside

S. wightiana Wall. ex Wt. & Arn. syn. *S. ebulus* Hook.f. (non L.) (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 220).

Stigmasterol and inositol isolated from roots (*Indian J. Chem.* 1976, *14*B, 475).

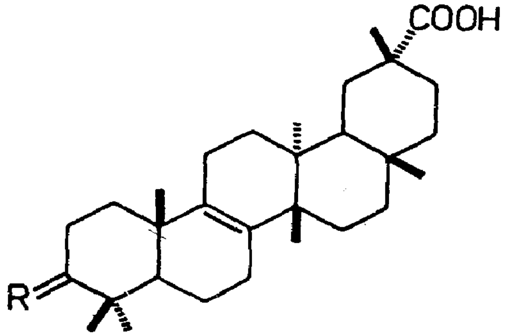
SANDORICUM (Meliaceae)

S. indicum Cav.; see *S. koetjape* (Burm.f.) Merrill

S. koetjape (Burm.f.) Merrill syn. *S. indicum* Cav. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 220).

Bryononic and bryonolic acids, meso-inositol and dimethyl mucate identified in plant (*Phytochemistry* 1972, *11*, 3341).

NEW COMPOUNDS



Bryononic acid
R = O
Bryonolic acid
R = β-OH,H

SANTALOIDES (Connaraceae)

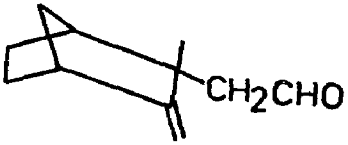
S. minus Schellenb.; see *Rourea minor* (Gaertn.) Alston

SANTALUM (Santalaceae)

S. album L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 360).

Isolation of exo-norbicycloekasantalal from sandalwood oil and its synthesis (*Tetrahedron Lett.* 1972, 2207).

NEW COMPOUNDS



Exo-norbicycloekasantalal

SANTOLINA (Asteraceae)

S. chamaecyparissus L.

Eng.- Lavender cotton.

α-Pinene, β-pinene, α-fenchene, sabinene, myrcene, α-phellandrene, β-phellandrene, limonene, γ-terpinene, p-cymol and α-santolinenone found in essential oil (*Khim. Prir. Soedin.* 1976, *12*, 664; *Chem. Abstr.* 1977, *86*, 145788 y).

Distribution : Native of Mediterranean region, grown in gardens on hills of south India.

SAPINDUS (Sapindaceae)

S. emarginatus Vahl syn. *S. trifoliatus* sensu Hook.f., p.p. (non L.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 360)

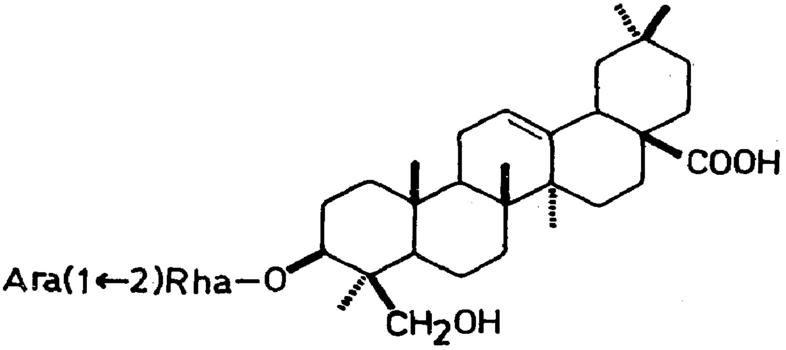
Alcoholic extract of seeds showed 80% anti-implantation activity in female rats at 100 mg/kg and 100% at 500 mg/kg whereas petroleum ether extract showed 60% activity at both doses (*Indian J. Med. Res.* 1974, *62*, 831).

Nuts contained kaempferol, quercetin and β-sitosterol (*Indian J. Pharm.* 1976, *38*, 141).

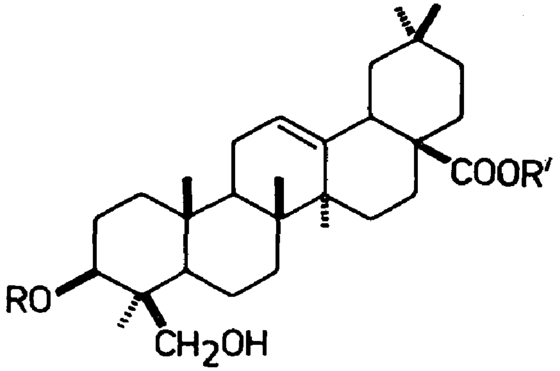
S. mukorossi Gaertn. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 360).

Two saponins - sapindoside A, mp. 214° and sapindoside B, mp. 276° - isolated and characterised as hederagenin-3(α-L-arabinopyranosyl-2α-L-rhamnopyranoside) and hederagenin-3-(α-L-arabinopyranosyl-2α-L-rhamnopyranosyl-3β-D-xylopyranoside) respectively (*Khim. Prir. Soedin.* 1970, *6*, 218; *Chem. Abstr.* 1970, *73*, 77544 v); isolation and characterisation of sapindoside C, mp. 235° (*Khim. Prir. Soedin.* 1970, *6*, 374; *Chem. Abstr.* 1970, *73*, 110062 m); isolation and structure of sapindoside D (*Khim. Prir. Soedin.* 1970, *6*, 316; *Chem. Abstr.* 1970, *73*, 110071 p); isolation and structure of sapindoside E (*Khim. Prir. Soedin.* 1970, *6*, 431; *Chem. Abstr.* 1971, *74*, 13384 f); quercetin and kaempferol identified (*Farm. Zh.* 1973, *28*, 87; *Chem. Abstr.* 1973, *78*, 89534 d); stigmasterol, its glucopyranoside, 28-norolean-12-en-3β,17β-diol and 2,23-ethylidenehederagenin isolated from pericarp of fruits; lauric, palmitic, oleic, stearic and arachic (arachidic) acids also detected (*Arch. Pharm.* 1979, *312*, 416; *Chem. Abstr.* 1979, *91*, 52717 n).

NEW COMPOUNDS



Sapindoside A



Sapindoside B
R = Xyl (3→1)Rha(2→1)Ara, R' = H
Sapindoside C
R = Ara(2→1)Rha(3→1)Xyl(4→1)Glu,
R' = H
Sapindoside D
R = Ara(2→1)Rha(3→1)Xyl(4→1)Glu[(2→1)Glu](5→1)Rha, R' = H
Sapindoside E
R = Ara(2→1)Rha(3→1)Xyl,
R' = Ara(2→1)Rha(3→1)Xyl(4→1)Glu[(6→1)Rha](2→1)Glu

BIOLOGICAL ACTIVITY

Saponins showed high spermicidal activity in both spot and IPPF tests with human semen, with MED of 0.05 and 0.5% respectively (*Contraception* 1976, *14*, 571).

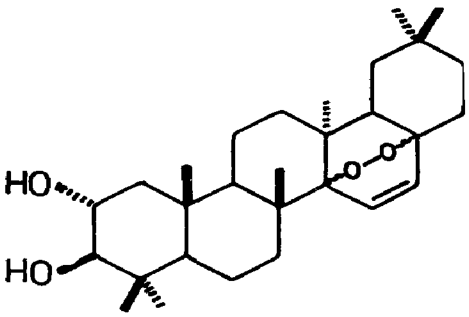
S. trifoliatus Hook.f.; see *S. emarginatus* Vahl

SAPIUM (Euphorbiaceae)

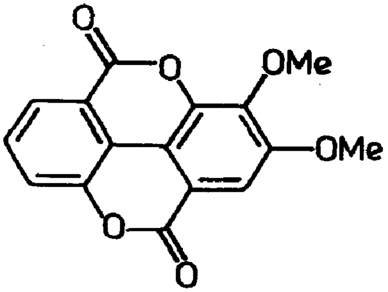
S. baccatum Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 361).

Acetoxyaleuritolic acid found in stem and bark (*Phytochemistry* 1975, *14*, 1876); a novel nortriterpene peroxide - baccatin - isolated from bark and its structure determined (*Tetrahedron Lett.* 1977, 3095); a diterpene ester - 4α-sapinene - isolated and characterised as 13-O-acetyl-4-deoxy-O-(N-methylanthraniloyl)-4α-phorbol (*Z. Naturforsch.* 1977, *32B*, 727; *Chem. Abstr.* 1977, *87*, 152415 y); a new 3,4-secotriterpene acid - sebiferic acid, mp. 178°- isolated from bark and its structure elucidated (*Indian J. Chem.* 1973, *11*, 1217); 3,4-di-O-methylellagic acid isolated from bark (*Indian J. Chem.* 1973, *11*, 1220).

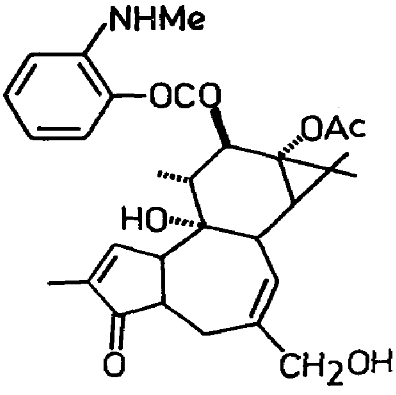
NEW COMPOUNDS



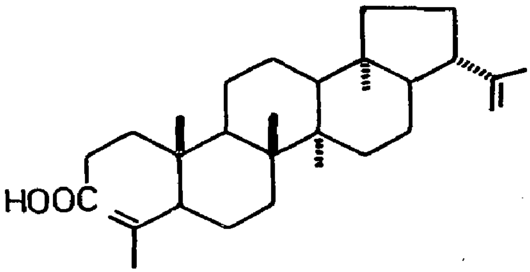
Baccatin



3,4-Di-O-Methylellagic acid



4α-Sapinene



Sebiferic acid

S. indicum Willd.; see *Excoecaria indica* (Willd.) Muell.-Arg.

SARACA (Caesalpiniaceae)

S. asoca (Roxb.) de Wilde syn. *S. indica* auct. non L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 221).

β-Sitosterol, quercetin, kaempferol-3-O-β-D-glucoside, quercetin-3-O-β-D-glucoside and apigenin-7-O-β-D-glucoside isolated from flowers (*J. Indian Chem. Soc.* 1976, *53*, 632); wax obtained from bark contained n-alkanes (C_{20}-C_{35}), esters (C_{34}-C_{60}) and primary alcohols (C_{20}-C_{30}); n-octacosanol also isolated (*Collect. Czech. Chem. Commun.* 1977, *42*, 1385); four anthocyanin pigments isolated from flowers, two of these identified as pelargonidin-3,5-diglucoside and cyanidin-3,5-diglucoside (*Quart. J. Crude Drug Res.* 1976, *20*, 3; *Chem. Abstr.* 1977, *87*, 65371 n); 24-methylcholest-5-en-3β-ol (1.5), (22E)-24-ethylcholesta-5,22-dien-3β-ol (22.1) and 24-ethylcholest-5-en-3β-ol (75.9%) isolated from bark (*Indian J. Chem.* 1977, *15B*, 765); palmitic, stearic, linoleic and linolenic acids found in fixed oil of flowers; β- and γ-sitosterols also isolated (*Proc. Nat. Acad. Sci.* India 1977, *47A*, 4; *Chem. Abstr.* 1978, *89*, 176336 r).

BIOLOGICAL ACTIVITY

A phenolic glycoside P2 showed highly potent and specific oxytocic activity *in vitro* and

in vivo on uteri of rat and isolated human myometrial strips and fallopian tube; P2 was active in remarkably low concentrations and nontoxic to animals upto 250 mg/kg (*Indian J. Med. Res.* 1970, *58*, 660); two crude glycosides isolated from bark exhibited uterine spasmogenic activity; both showed significant stimulant action on isolated uteri of rat, guinea pig, rabbit, dog and human; pure phenolic glycoside P2 was highly potent and showed consistent oxytocic activity (*Indian J. Med. Res.* 1970, *58*, 947).

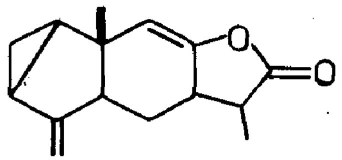
S. indica L.; see *S. asoca* (Roxb.) de Wilde

SARCANDRA (Chloranthaceae)

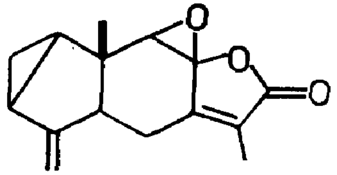
S. glabra (Thunb.) Nakai syn. *Chloranthus glaber* (Thunb.) Makino, *C. brachystachys* Blume (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 61).

Two new sesquiterpenes - chloranthalactones A and B - isolated and their structures elucidated (*Heterocycles* 1978, *9*, 139).

NEW COMPOUNDS



Chloranthalactone A



Chloranthalactone B

SARCOCOCCA (Buxaceae)

S. pruniformis Lindl.; see *S. saligna* (D. Don) Muell.-Arg.

S. saligna (D. Don) Muell.-Arg. syn. *S. pruniformis* sensu Hook.f., p.p. (non Lindl.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 362).

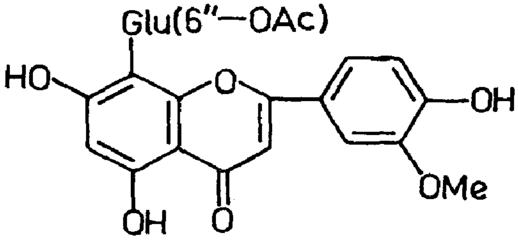
Identity of salignine with saracodine established (*Pakistan J. Sci. Ind. Res.* 1969, *12*, 161; *Chem. Abstr.* 1970, *72*, 79273 k).

SAROTHAMNUS (Papilionaceae)

S. scoparius (L.) Wimm. ex W.D.J. Koch syn. *Cytisus scoparius* (L.) Link (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 364).

Seed oil contained saturated acids (35.4) and linoleic acid (57.9%) (*Indian J. Appl. Chem.* 1972, *35*, 35; *Chem. Abstr.* 1973, *79*, 96832 c); a new C-flavone glycoside - 6''-O-acetylscoparin (6''-O-acetylscoparoside) - isolated from leaves (*Lloydia* 1977, *40*, 591).

NEW COMPOUNDS



6''-O-Acetylscoparin

SASSAFRAS (Lauraceae)

S. albidum (Nutt.) Nees

Eng.- Sassafras, Ague tree.

Boldine, norboldine, isoboldine, norcinnamolaurine, cinnamolaurine and reticuline perchlorate isolated from root bark (*Phytochemistry* 1976, *15*, 1803).

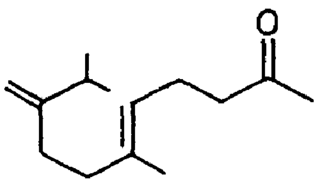
Distribution : Found in eastern regions of North America. Dried roots reported to be imported into India.

SAUSSUREA (Asteraceae)

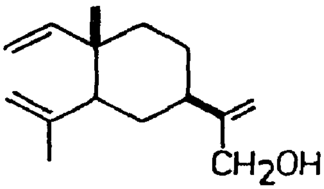
S. lappa (Decne.) Sch.-Bip. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 364).

Costunolide, dehydrocostuslactone, α-cyclocostunolide and costic, palmitic and linoleic acids, besides β-sitosterol, isolated from roots of Punjab variety, whereas Kashmir variety yielded costunolide, dehydro-costuslactone, α-cyclocostunolide, β-cyclocostunolide and isoalantolactone (*Indian J. Chem.* 1977, *15*B, 956); four new sesquiterpenes - (-)α-costol, (+)γ-costol, (-)elema-1,3,11(13)-trien-12-ol and (+)γ-costal - isolated from root oil in addition to (-)α-selinene, (+)selina-4,11-diene, (-)α-trans-bergamotene, (-)α-costal, (+)β-costol, (-)elema-1,3,11(13)-trien-12-al, (-)E-trans-bergamota-2,12-dien-14-al, (-)ar-curcumene and (-)caryophyllene oxide (*Helv. Chim. Acta* 1977, *60*, 2177); (E)6,10-dimethyl-9-methylideneundec-5-en-2-one isolated from root oil and synthesised (*Helv. Chim. Acta* 1978, *61*, 984).

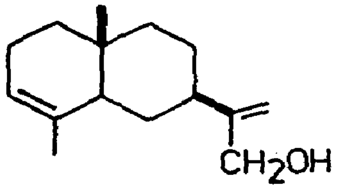
NEW COMPOUNDS



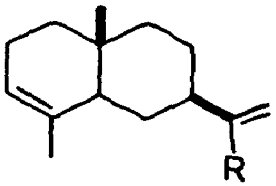
6,10-Dimethyl-9-methylideneundec-5-en-2-one



Elema-1,3,11(13)trien-12-ol



α-Costol



γ-Costol
R = CH_2OH
γ-Costal
R = CHO

S. sacra Edgew.; see *S. simpsoniana* (Field & Gardn.) Lipsch.

S. simpsoniana (Field & Gardn.) Lipsch. syn. *S. sacra* Edgew.
Eng.- Sacred saussurea; Kash.- Jogi padshah; Garhwal - Ghuggi.
Plant contained alkaloids - saussurol and colchicine - and limonene, 1-cadinol and β-amyrenol (*J. Indian Chem. Soc.* 1974, *51*, 910).
Distribution : Himalayas from Garhwal to Sikkim, alt. 4200-5500 m.

SAXIFRAGA (Saxifragaceae)

S. cilata Royle; see *Bergenia ciliata* (Haw.) Sternb. forma *ligulata* Yeo

S. diversifolia Wall. ex Ser.; see *S. moorkoftiana* Wall. ex Sternb.

S. ligulata Wall.; see *Bergenia ciliata* (Haw.) Sternb. forma *ligulata* Yeo

S. ligulata Wall. var. *ciliata* (Royle) Hook.f. & Thoms; see *Bergenia ciliata* (Haw.) Sternb. forma *ligulata* Yeo

S. moorkoftiana Wall. ex Sternb. syn. *S. diversifolia* sensu Clarke, p.p. (non Wall. ex Ser.).
Mannitol isolated (*Indian J. Chem.* 1976, *14*, 475).
Distribution : Himalayas from Kashmir to Bhutan, alt. 2700-5100 m.

SCABIOSA (Dipsacaceae)

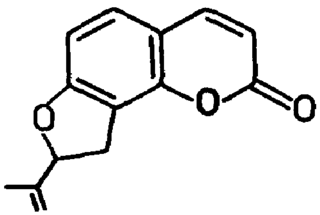
S. atropurpurea L.
Swertisin isolated (*Khim. Prir. Soedin.* 1977, *13*, 705; *Chem. Abstr.* 1978, *88*, 60093 j).
Distribution : Native of South Europe; grown in Indian gardens as ornamental.

SCAEVOLA (Goodeniaceae)

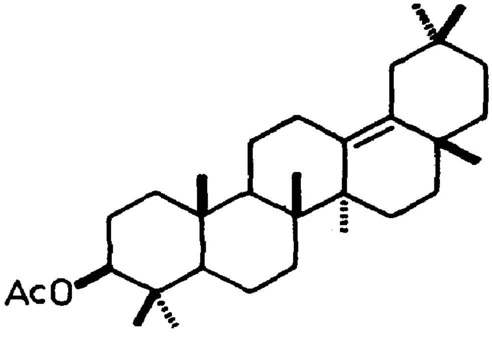
S. lobelia L.
A coumarin (I), isoangenomalin, a terpene aldehyde (II), 19-H, 13(18)-dehydrogermanicol acetate and traces of trans-1,3-tridecadien-5,7,9,11-tetrayne isolated and their structures established (*Chem. Ber.* 1975, *108*, 433).

Distribution : Deccan Peninsula.

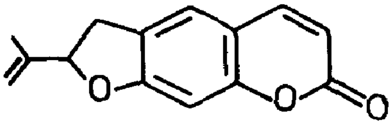
NEW COMPOUNDS



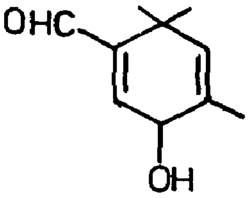
I



19-H,13(18)dehydrogermanicol acetate



Isoangenomalin



II

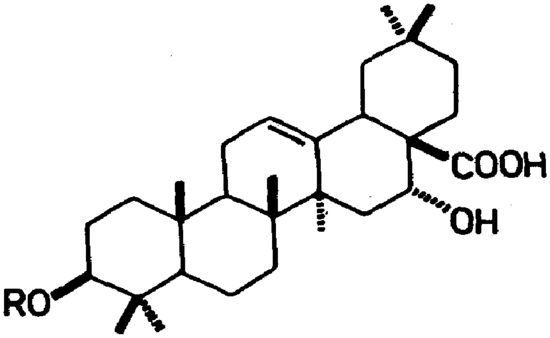
SCHEFFLERA (Araliaceae)

S. capitata (W. & A.) Harms syn. *Brassaia capitata* (W. & A.) Clarke

A new saponin - scheffleroside - isolated which on hydrolysis yielded echinocystic acid, fucose, galactose and glucuronic acid in equimolar ratio (*Indian J. Chem.* 1977, *15*B, 1139).

Distribution : Nilgiri Hills.

NEW COMPOUNDS



Scheffleroside

R = Gluc.acid-Gal-Fuc

BIOLOGICAL ACTIVITY

Scheffleroside showed spermicidal activity (*Indian J. Chem.* 1977, *15*B, 1139).

SCHINUS (Anacardiaceae)

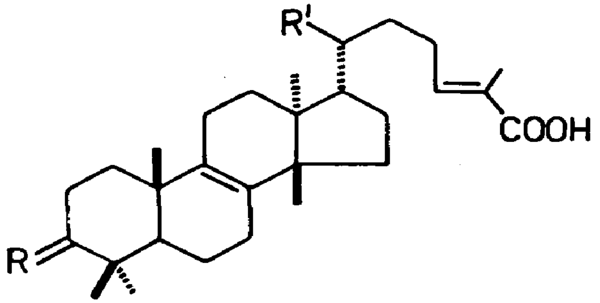
S. molle L.

Eng. - Peruvian pepper tree, Mastic tree.

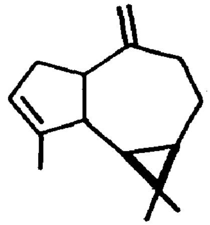
A new sesquiterpene hydrocarbon-β-spathulene - isolated from essential oil and characterised (*Phytochemistry* 1974, *13*, 865); a new triterpenoid - isomasticadienonalic acid - and isomasticadienonic acid isolated from berries; structure of former elucidated (*Gazz. Chim. Ital.* 1976, *106*, 785; *Chem. Abstr.* 1977, *86*, 140291 w); in addition to 3-epi-isomasticadienolalic acid, masticadienonic and 3-epi-isomasticadienolic acids isolated from oleoresin from berries and characterised (*Phytochemistry* 1978, *17*, 2107).

Distribution : Native of South America, planted in Indian gardens and avenues.

NEW COMPOUNDS



3-Epi-Isomasticadienolic acid
R = α-OH,H, R' = Me
3-Epi-Isomasticadienolalic acid
R = α-OH,H, R' = CHO
Isomasticadienonalic acid
R = O, R' = CHO
Isomasticadienonic acid
R = O, R' = Me



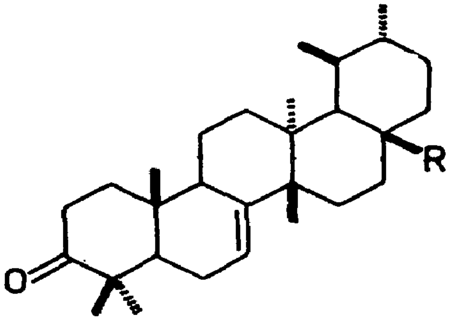
β-Spathulene

S. terebinthifolius Raddi (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 365).

Pharmacognostic study of bark (*Cienc. Cult.* 1973, *25*, 631; *Chem. Abstr.* 1974, *80*, 68374 g).

Masticadienonic acid, 3α-hydroxymasticadienonic acid, sitosterol and simiarenol from leaves (*Phytochemistry* 1974, *13*, 659); two new triterpene ketones - bauerenone and terebenthifolic acid - isolated from bark along with α-amyrin and α-amyrenone (*Phytochemistry* 1975, *14*, 2300); masticadienoic, hydroxymasticadienoic and ursolic acids isolated from berries whereas its oil yielded α- and β-pinenes, sabinene, car-3-ene, α- and β-phellandrenes, limonene, p-cymene, terpinolene, cis-sabinol, carvotanacetone, β-caryophyllene, α- and β-cubebene, simiarenol, simiarenone, α-amyrin and α-amyrenone (*Phytochemistry* 1977, *16*, 1301).

NEW COMPOUNDS



Bauerenone
R = Me
Terebenthifolic acid
R = COOH

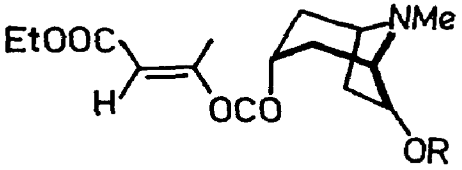
SCHIZANTHUS (Solanaceae)

S. pinnatus Ruiz & Pav.

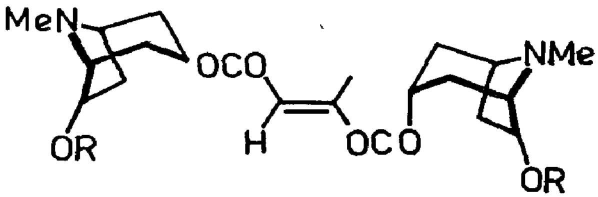
Structures of two new tropane alkaloids - schizanthines A and B (*Phytochemistry* 1979, *18*, 171).

Distribution : Grown in Indian gardens.

NEW COMPOUNDS



Schizanthine A
R = Dimethylacryloyl



Schizanthine B
R = Dimethylacryloyl

SCHIZOLOMA (Lindsaeaceae)

S. ensifolia (Sw.) J. Smith; see *Lindsaea ensifolia* Sw.

SCHLEICHERA (Sapindaceae)

S. oleosa (Lour.) Oken syn. *S. trijuga* Willd. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, p. 223).

Major cyanolipid of oil shown to consist of two fatty acids esterified with 1-cyano-2-hydroxymethylprop-2-en-1-ol (*Indian J. Chem.* 1972, *10*, 244); C_{26-35} alkanes, C_{26-34} alcohols, stigmasterol, β-sitosterol, campesterol, cholesterol, glucose, fructose, tartaric acid and oxalic acid present in leaves (*Collect. Czech. Chem. Commun.* 1977, *42*, 3487).

S. trijuga Willd.; see *S. oleosa* (Lour.) Oken

SCHOTIA (Caesalpiniaceae)

S. branchypetala Sond.

Eng. - Boerboon.

3,3′,4′,5,5′-Pentahydroxystilbene isolated (*Phytochemistry* 1971, *10,* 2837).

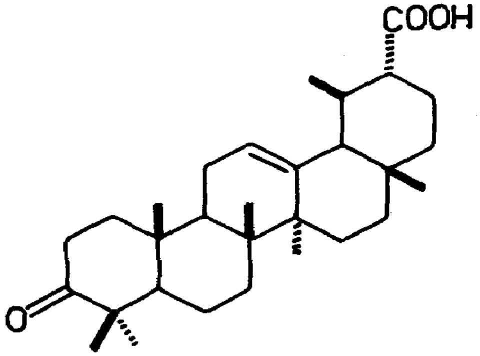
Distribution : Native of tropical Africa, grown in Indian Botanic Garden, Howrah.

SCOPARIA (Scrophulariaceae)

S. dulcis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 365).

Hexacosanol, β-sitosterol and D-mannitol from root bark (*J. Indian Chem. Soc.* 1969, *46,* 765); ifflaionic acid isolated from roots together with 6-methoxybenzoxazolinone and its structure determined (*Phytochemistry* 1976, *15*, 1997); scutellarein, its 7-O-methyl ether and its 7-O-β-D-glucuronide isolated from leaves (*Curr. Sci.* 1979, *48*, 67).

NEW COMPOUNDS



Ifflaionic acid

SCOPOLIA (Solanaceae)

S. anomala (Link & Otto) Airy-Shaw syn. *S. lurida* (Link. & Otto ex Nees) Dunal (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p.366).

Scopoletin isolated from roots (*Ann. Acad. Med. Lodz.* 1971, *12*, 417; *Chem. Abstr.* 1973, *78*, 156650 h).

BIOLOGICAL ACTIVITY

Scopolin had LD50 501 mg/kg, i.v., in mice it temporarily lowered arterial pressure, had weak cardiotonic effect, potentiated activity of chloral hydrate and hexenal (*Med. Zh. Uzb.* 1974, 97; *Chem. Abstr.* 1974, *81*, 163460 m).

S. lurida (Link & Otto ex Nees) Dunal; see *S. anomala* (Link & Otto) Airy-Shaw

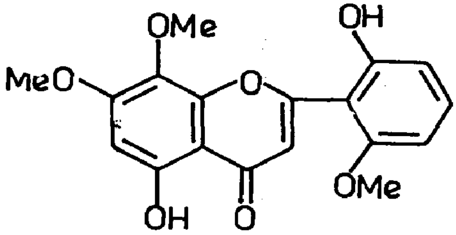
SCUTELLARIA (Lamiaceae)

S. barbata D. Don syn. *S. rivularis* Wall.

Herb used in Taiwanian folk-medicine for the treatment of hepatitis and tumours; wogonin, its 7-O-methyl ether and rivularin isolated from roots; latter characterised as 2',5-dihydroxy-6',7,8-trimethoxyflavone (*T ai-wan Yao Hsueh Tsa Chih* 1978, *30*, 36; *Chem. Abstr.* 1979, *90*, 164732 z).

Distribution : Nepal and Khasia Hills, alt. 1200-1500 m; Nilgiri and Annamalai Hills in south India.

NEW COMPOUNDS



Rivularin

S. galericulata L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 224).

A new glycoside - galeroside - isolated together with baicalein, baicalin, apigenin, apigenin-7-glucoside (*Farm. Zh.* 1972, *27*, 58; *Chem. Abstr.* 1973, *78*, 40407 e); galeroside identified as baicalein-7-β-L-rhamnofuranoside (*Khim. Prir. Soedin.* 1972, *8*, 242; *Chem. Abstr.* 1972, *77*, 58845 k).

S. rivularis Wall.; see *S. barbata* D. Don

SCUTIA (Rhamnaceae)

S. indica Brongn.; see *S. myrtina* (Burm.f.) Kurz

S. myrtina (Burm.f.) Kurz syn. *S. indica* Brongn.

Tel. - Gariki; Tam. - Tuvadi; Kan. - Kurudi; Bo. - Chimat.

Tetratriacontan-22-ol-13-one (grewinol), β-sitosterol, tetratriacontanoic acid, quercetin-3-O-β-D-glucoside and leucocyanidin isolated (*J. Indian Chem. Soc.* 1976, *53*, 739).

Distribution : Deccan Peninsula from Mahabaleshwar southwards and Orissa.

SECHIUM (Cucurbitaceae)

S. edule (Jacq.) Sw.

Eng. - Chow-chow, Chayote; Tam. - Seeme kattirikkai; Kan. - Seeme badane.

α-Amino-γ-ureidobutyric acid, mp. 176°, isolated from seeds (*Meiji Daigaku Nogakubu Kenkyu Hokoku* 1975, *34*, 1; *Chem. Abstr.* 1976, *84*, 71478 g).

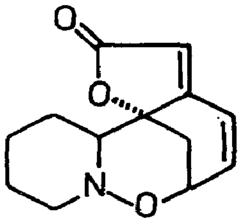
Distribution : Native of Central America and Mexico, cultivated in Tamil Nadu, Karnataka and Maharashtra.

SECURINEGA (Euphorbiaceae)

S. suffruticosa (Pall.) Rehder (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 367).

Structure elucidation of phyllantidine (*Tetrahedron Lett.* 1972, 1877); isolation of securinine (Pol. 93,994 (1975) July 26; *Chem. Abstr.* 1979, *90*, 76552 k); biosynthesis of securinine (*Phytochemistry* 1977, *16*, 561).

NEW COMPOUNDS



Phyllantidine

S. virosa (Roxb. ex Willd.) Baillon syn. *Flueggea virosa* (Roxb. ex Willd.) Baillon, *F. microcarpa* Blume (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 368).

Bergenin obtained from leaves (*Phytochemistry* 1972, *11*, 452); friedelin, friedelinol, hexacosane and sitosterol from bark (*Phytochemistry* 1975, *14*, 1876).

SEDUM (Crassulaceae)

S. asiaticum (D. Don) DC.; see *Rhodiola quadrifida* (Pall.) Fisher & Meyer

S. ewersii Ledeb.

Rutin, quercetin, kaempferol, kaempferol-7-O-α-L-rhamnopyranoside,kempferol-4-O-β-D-glucopyranoside along with umbelliferone, 6,7-dihydroxycoumarin and arbutin isolated (*Khim. Prir. Soedin.* 1976, *12*, 389; *Chem. Abstr.* 1976, *85*, 106651 h).

Distribution : Himalayas from Kashmir to Kumaon, alt. 2700-5100 m.

S. linearifolium Royle; see *Rhodiola sinuata* (Royle ex Edgew.) Fu

S. linearifolium Royle var. *pauciflorum* (Edgew.) Clarke; see *Rhodiola sinuata* (Royle ex Edgew.) Fu

S. quadrifidum Pall.; see *Rhodiola quadrifida* (Pall.) Fisher & Meyer

S. trifidum Wall. ex Hook.f. & Thoms.; see *Rhodiola sinuata* (Royle ex Edgew.) Fu

SELINUM (Apiaceae)

S. candollii DC. syn. *S. tenuifolium* Wall. ex Clarke, *S. tenuifolium* Wall. ex Clarke var.

filicifolia (Edgew.) Clarke

Simla - Khes havo; Kash. - Bhootakeshi.

Oil showed antibacterial activity (*Indian Perfum.* 1976, *20*, 23; *Chem. Abstr.* 1978, *88*, 110370 v).

Heraclenin, bergapten and imperatorin isolated from roots (*J. Indian Chem. Soc.* 1971, *48*, 1067; *Phytochemistry* 1974, *13*, 235); heraclenol and 8-geranyloxypsoralen from roots (*Phytochemistry* 1974, *13*, 235); iso-imperatorin (0.07, 0.07), osthol (0.07, 0.02), oxypeucedanin (0.4, 1.2) and imperatorin (0.036, 0.007%) isolated from inflorescence and roots respectively (*Indian J. Pharm. Sci.* 1978, *40*, 98); detection of limonene, elemol, terpineol, geraniol and eudesmol in root oil by GC (*Indian Perfum.* 1978, *22*, 127; *Chem. Abstr.* 1979, *90*, 76395 m).
Distribution : Himalayas from Kashmir to Nepal, alt. 1800-4200 m.

S. papyraceum Clarke

Knidilin, xanthotoxin, isopimpinellin and β-sitosterol isolated from roots (*J. Indian Chem. Soc.* 1976, *53*, 735).
Distribution : Himalayas from Kashmir to Sikkim, alt. 2400-3600 m.

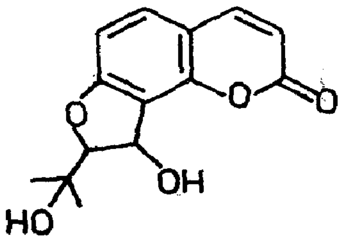
S. tenuifolium Wall. ex Clarke; see *S. candollii* DC.

S. tenuifolium Wall. ex Clarke var. *filicifolia* (Edgew.) Clarke; see *S. candollii* DC.

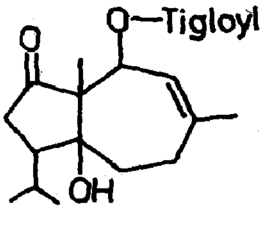
S. vaginatum (Edgew.) C.B. Clarke (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 369).

A new furanocoumarin - vaginol - isolated and its structure determined (*Indian J. Chem.* 1970, *8*, 200); two coumarins - anomalin and isopteryxin - isolated from roots (*Indian J. Chem.* 1971, *9*, 418; *ibid.* 1973, *11*, 1334); n-triacontane, dotriacontane, triacontanol, 12-tricosanol, sucrose, D-mannitol and elemol (26.0%) found in root oil (*Indian Perfum.* Pt. 2 1975, *18*, 34; *Chem. Abstr.* 1977, *87*, 90575 q); structure of vaginatin elucidated (*Indian J. Chem.* 1978, *16*B, 4).

NEW COMPOUNDS



Vaginol



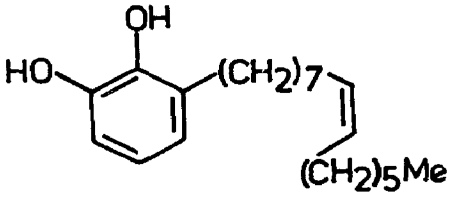
Vaginatin

SEMECARPUS (Anacardiaceae)

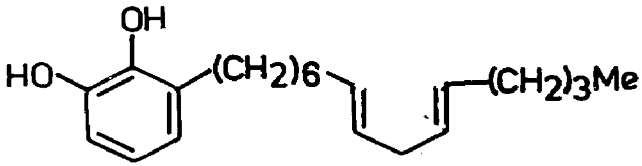
S. anacardium L.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 369).

Bhilawanol found to be a mixture of 1,2-dihydroxy-3-(pentadecenyl-8')-benzene and 1,2-dihydroxy-3-(pentadecadienyl-8',11')-benzene (*Indian J. Chem.* 1971, *9*, 1044); studies on methylated bhilawanol showed that it contained more than seven components; two major components identified as dimethyl ethers of 1-pentadeca-8-enyl-2,3-dihydroxybenzene (I) and 1-pentadeca-7,10-dienyl-1,3-dihydroxybenzene (II); defatted nuts yielded three biflavones A, B and C; latter two compounds characterised as 3',8-binaringenin and 3',8-biliquiritigenin (*Phytochemistry* 1973, *12*, 671); re-examination of bhilawanol showed it to be comprised of two components, 1,2-dihydroxy-3-pentadecenylbenzene (32-32%) and its corresponding diene analogue (68-70%) (*Phytochemistry* 1974, *13*, 513); a new biflavan - tetrahydrorobustaflavone - and tetrahydroamentoflavone isolated from nuts; leaves yielded only amentoflavone (*Indian J. Chem.* 1977, *15*B, 615).

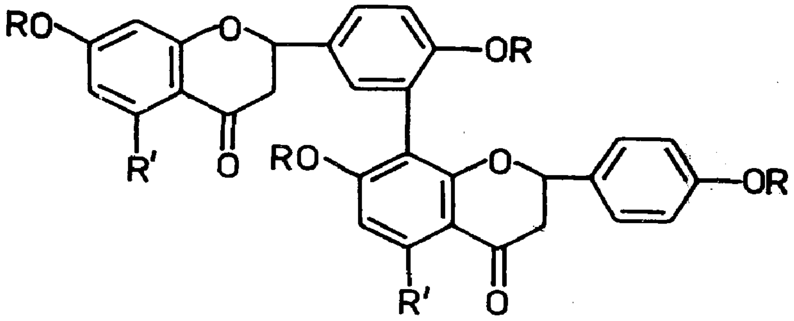
NEW COMPOUNDS



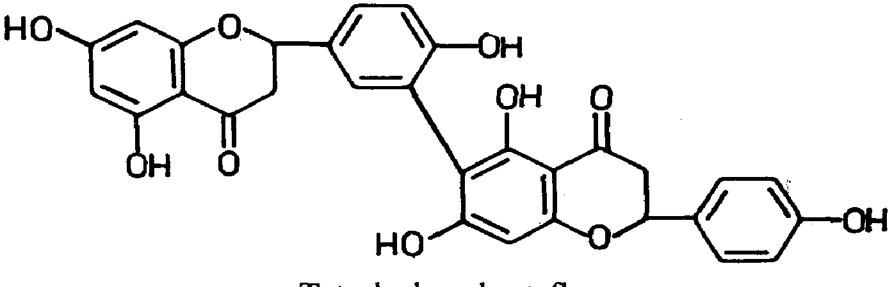
I



II



3',8-Binaringenin
R = H, R' = OH
3',8-Biliquiritigenin
R = Me, R' = H



Tetrahydrorobustaflavone

SENECIO (Asteraceae)

S. scandens Buch.-Ham. ex D. Don

Senecionine and seneciphylline isolated and identified (*Curr. Sci.* 1977, *46*, 141).

Distribution : Himalayas from Kumaon to Sikkim, Khasi Hills, Pulney and Nilgiri Hills, alt. 1500-3000 m.

S. thomsonii Clarke; see *Ligularia thomsonii* (Clarke) Pojark

SESBANIA (Papilionaceae)

S. aculeata Pers. var. *cannabina* (Retz.) Baker; see *S. cannabina* (Retz.) Poir.

S. aegyptiaca (Poir.) Pers.; see *S. sesban* (L.) Merr.

S. cannabina (Retz.) Poir. syn. *S. aculeata* Pers. var. *cannabina* (Retz.) Baker

S. - Jayanti; H. - Dhunchi; Mar. - Ran shevari; Guj. - Sasi-ikad; Tel. - Errajiluga; Tam. - Mullagathi; Kan. - Mullujeerangi, Dhaincha; Mal. - Kitannu; Oriya - Dhaincha, Tentua; P. - Jayanti, Jhijan.

Gum in endosperm of seeds consisted of galactose and mannose in ratio of 1:2.1 (*Chih Wu Hsueh Pao* 1978, *20*, 323; *Chem. Abstr.* 1979, *90*, 118073 n).

Distribution : Throughout plains of India.

S. grandiflora (L.) Poir. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 371).

Seed saponin on hydrolysis yielded oleanolic acid as major genin (*Indian J. Appl. Chem.* 1971, *34*, 214; *Chem. Abstr.* 1972, *77*, 85583 e).

S. sesban (L.) Merr. syn. *S. aegyptiaca* (Poir.) Pers. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 226).

Extract of flowers possessed significant abortifacient activity in mice (*Indian J. Med. Res.* 1975, *63*, 378).

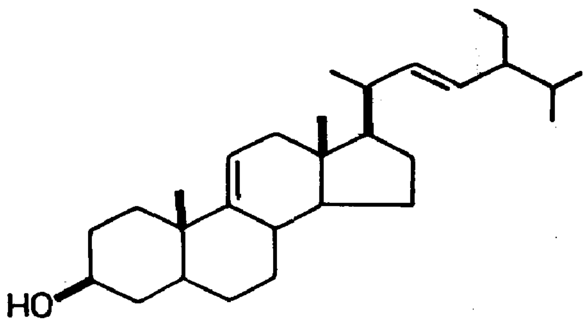
Determination of fatty acid composition of seed oil (*J. Am. Oil Chemists Soc.* 1979, *56*, 904; *Chem. Abstr.* 1979, *91*, 189830 p).

SESELI (Apiaceae)

S. diffusum (Roxb. ex Sm.) Sant. & Wagh syn. *S. indicum* W. & A. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 372).

A new sterol - indosterol - isolated and characterised as β-hydroxy-5α-stigmasta-9(11),22 (23)-diene (*Tetrehedron Lett.* 1974, 1221; *J. Indian Chem. Soc.* 1974, *51*, 904).

NEW COMPOUNDS



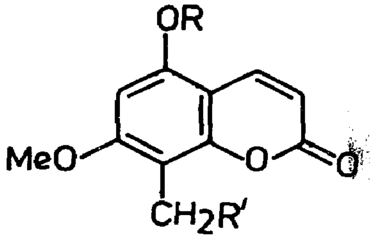
Indosterol

S. indicum W. & A.; see *S. diffusum* (Roxb. ex Sm.) Sant. & Wagh

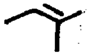
S. libanotis (L.) W. Koch syn. *S. sibiricum* Benth. ex Clarke (non L.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 372).

A new coumarin - sesebiricin, mp. 120° - obtained from roots and characterised as 7-methoxy-5-isopentenyloxy-8-isopentenylcoumarin (*Indian J. Chem.* 1970, *8*, 202); structures of sesebrin, sesebrinol and sibiricol elucidated; sitosterol, isobergapten, phellopterin, coumurrayin, osthenol and meranzin also isolated (*Phytochemistry* 1978, *17*, 2111).

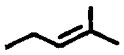
NEW COMPOUNDS



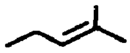
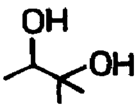
Sesebiricin

R,R' = 

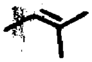
Sesebrin

R = , **R' = 3,3'-dimethyloxiran-2-yl**

Sesebrinol

R =  R' = 

Sibiricol

R = H, R' = 

S. sibiricum Benth. ex Clarke; see *S. libanotis* (L.) W. Koch.

SESUVIUM (Aizoaceae)

S. portulacastrum (L.) L.

Eng. - Seaside purslane; B. - Jadu palang; Tel. - Vangrreddi kura; Tam. - Van kiru valai, Vungaravasi; Bo. - Dhapa.

Ecdysterone isolated (*Phytochemistry* 1971, *10*, 2225).

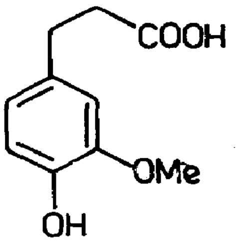
Distribution : Coastal regions of India.

SHOREA (Dipterocarpaceae)

S. robusta Gaertn.f. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 226).

Fat from nuts contained cis-9,10-epoxystearic acid (*Chem. Ind.* 1972, 805); corilagin, ellagic, chebulinic and gallic acids from seeds (*Leather Sci.* 1977, *24*, 243); a new phenolic acid - shorbic acid, mp. 93° - isolated from seeds (*Fitoterapia* 1979, *50*, 7).

NEW COMPOUNDS



Shorbic acid

BIOLOGICAL ACTIVITY

Shorbic acid showed inhibitory activity in wheat coleoptile bioassay (*Fitoterapia* 1979, *50*, 7).

SIDA (Malvaceae)

S. acuta Burm. f. ssp. *acuta* syn. *S. carpinifolia* sensu Masters (non L.f.) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 226, 227).

Ecdysterone isolated (*Indian J. Chem.* 1976, *14*B, 907).

S. carpinifolia L.F.; see *S. acuta* Burm.f. ssp. *acuta*

S. retusa L.; see *L. rhombifolia* L. ssp. *retusa* (L.) Borssum

S. rhombifolia L. ssp. *retusa* (L.) Borssum syn. *S. rhombifolia* L. var. *retusa* (L.) Mast., *S. retusa* L.

Crude extract of root (5 and 10 g/kg) produced sedative effect and significant potentiation of pentobarbitone sleeping time in mice. Extract did not produce any change in normal temperature of mice, but 10 g/kg dose showed significant decrease in rectal temperature of

pyretic rats 2 and 3 hr after administration (*Japanese J. Pharm.* 1971, *21*, 136).
Distribution : Throughout plains of India.

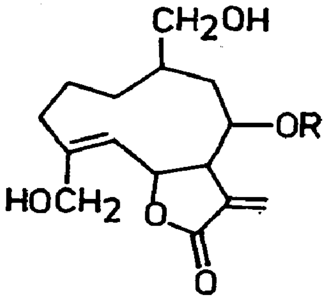
S. rhombifolia L. var. *retusa* (L.) Mast.; see *S. rhombifolia* L. ssp. *retusa* (L.) Borssum

SIEGESBECKIA (Asteraceae)

S. orientalis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 372).

A new sesquiterpene lactone - orientin - isolated and its structure determined (*Khim. Prir. Soedin.* 1976, *12*, 394; *Chem. Abstr.* 1976, *85*, 124182 k); 3,7-dimethylquercetin and two unknown terpenoids isolated (*Proc. Nat. Sci. Counc. Taiwan* 1976, *9*, 149; *Chem. Abstr.* 1977, *86*, 145823 f).

NEW COMPOUNDS



Orientin
R = α-Methylacryloyl

SILYBUM (Asteraceae)

S. marianum (L.) Gaertn. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 373).

Optically active dehydrodiconiferyl alcohol isolated from seeds (*Ann. Chem.* 1970, *736*, 170); twelve polyacetylenes and one polyene detected in roots; structures of seven of these (I-VII) determined whereas other substances could only be partially characterised (*Arch. Pharm.* 1970, *303*, 7; *Chem. Abstr.* 1970, *73*, 7120 e); an isomer of silymarin - silychristin - isolated from fruits and characterised (*Tetrahedron Lett.* 1971, 1895; *Indian J. Chem.* 1972, *10*, 808; *Yakugaku Zasshi* 1975, *95*, 1017; *Chem. Abstr.* 1976, *84*, 2246 t); myristic, palmitic, stearic and oleic acids, taxifolin, silybin and silydianin isolated from seeds (*Indian J. Chem.* 1972, *10*, 808); silybonol isolated from seeds (Jpn. 7,391,212(1972) March 11; *Chem. Abstr.* 1974, *80*, 112619 s); new flavanolignans - 2,3-dehydrosilymarin and 2,3-dehydrosilychristin - isolated from seeds along with silymarin (*Yakugaku Zasshi* 1975, *95*, 1017; *Chem. Abstr.* 1976, *84*, 2246 t); a review on silymarin and its pharmacological activity (*Herba Pol.* 1976, *22*, 350; *Chem. Abstr.* 1977, *87*, 111076 v); silymonin and silandrin isolated from fruits in addition to silybin (*Herba Hung.* 1978, *17*, 65; *Chem. Abstr.* 1979, *91*, 52681 y); tannins determined in flowers, leaves and stems (5,4 and 1% respectively), d-catechin also detected (*Ann. Acad. Med.*

Gedanensis 1978, *8*, 97; *Chem. Abstr.* 1979, *90*, 200297 x).

NEW COMPOUNDS

$MeCH{=}CH(C{\equiv}C)_4CH{=}CH_2$

I

$Me(C{\equiv}C)_5CH{=}CH_2$

II

$Me(C{\equiv}C)_5CH{=}CHCH{=}CH_2$

III

$CH_2{=}CH(C{\equiv}C)CHCH_2CHO$

IV

$Me(C{\equiv}C)_3CH{=}CHCH{=}CHCH_2CH_2OAc$

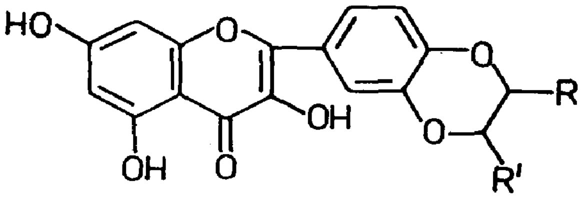
V

$MeCH{=}CH(C{\equiv}C)_2CHCH{=}CH(CH_2)_5CH{=}CH_2$

VI

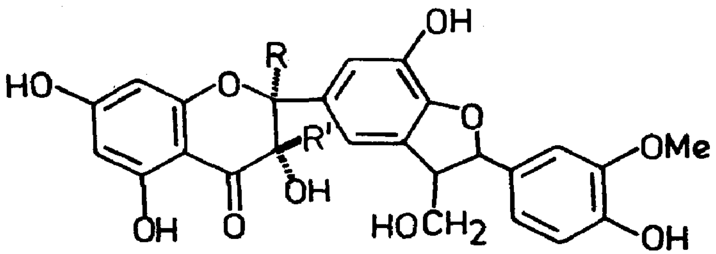
$MeCH{=}CH(C{\equiv}C)_2CH(OH)C{=}CH(CH_2)_5CH{=}CH_2$

VII



Silybonol

R,R′ = CH_2OH/C_6H_3(3-OMe,4-OH)

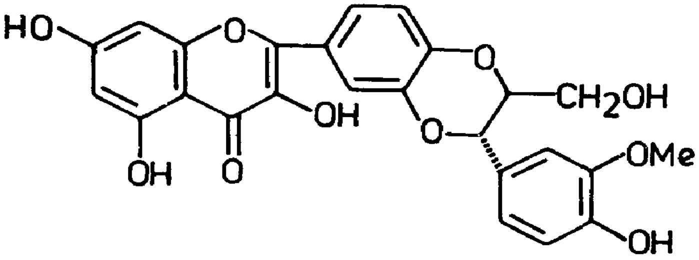


Silychristin

R,R′ = H

2,3-Dehydrosilychristin

R,R′ = Δ



2,3-Dehydrosilymarin

BIOLOGICAL ACTIVITY

Silybonol affected bile secretion and is used in treatment of liver diseases (Jpn. 7,391,212 (1972) March 11; *Chem. Abstr.* 1974, *80*, 112619 s); silymarin (= silybin), an antihepatotoxic principle, did not affect respiratory chain or P/O ratio of rat liver mitochondria *in vitro*. Swelling produced in liver mitochondria by inorganic phosphate or lysolecithin was counteracted by it (*Pharmacol. Res. Commun*. 1973, *5*, 231; *Chem. Abstr.* 1974, *80*, 91135 p); cell membrane of isolated hepatocytes was affected on treatment with 0.1-1.0 mM silybin (*Symp. Pharmacodyn. Silymarin* 1976, 176; *Chem. Abstr.* 1978, *88*, 182535 a); silymarin (420 mg/day, orally) was ineffective in the treatment of human viral hepatitis and did not affect serum enzymes and bilirubin (*Med. Klin.* 1977, *72*, 513; *Chem. Abstr.* 1977, *87*, 48153 a); treatment of rats with silymarin counteracted hepatotoxic action of oxyterracine and rondomycin given along with carbon tetrachloride as evidenced by depression of serum alanine aminotransferase (*Herba Pol.* 1977, *23*, 155; *Chem. Abstr.* 1978, *88*, 146276 h).

SINAPSIS (Brassicaceae)

S. alba L. syn. *Brassica alba* (L.) Rabenh.

Eng. - White mustard; H. - Safed sarson.

Sinalbin and sinapine found in seeds of Egyptian plant (*Egypt. J. Pharm. Sci.* 1977, *16*, 113; *Chem. Abstr.* 1977, *87*, 19042 h).

Distribution : Cultivated in Kashmir and Punjab, also grows as weed in cultivated fields.

SISYMBRIUM (Brassicaceae)

S. sophia L.; see ***Descurainia sophia*** **(L.) Webb ex Prantl**

SKIMMIA (Rutaceae)

S. laureola (DC.) Sieb. & Zucc. ex Walp. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 374).

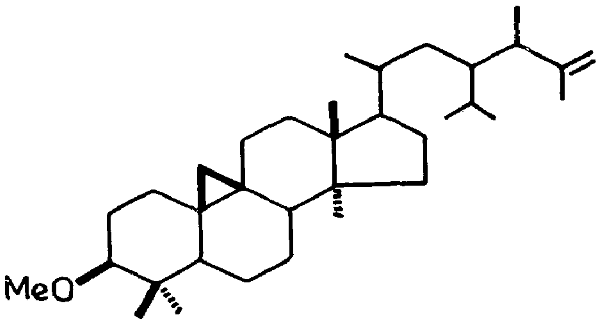
Lupenone and lupeol isolated from leaves; β-sitosterol, skimmianine, scopoletin, umbelliferone, bergapten and isopimpinellin from leaves and roots (*Curr. Sci.* 1973, *42*, 59; *Planta Med.* 1978, *34*, 338); xanthotoxin, heraclenin, isoimperatorin, scopoletin glucoside and sucrose obtained from roots (*Planta Med.* 1978, *34*, 338).

S. wallichii Hook.f. & Thoms. ex Gamble

Taraxerone, 3-epitaraxerol and sitosterol found in bark (*Phytochemistry* 1975, *14*, 1876); a new triterpene methyl ether - skimmiwallichin - isolated together with taraxerone and characterised (*Indian J. Chem.* 1977, *15*B, 811).

Distribution : Nepal and Sikkim.

NEW COMPOUNDS



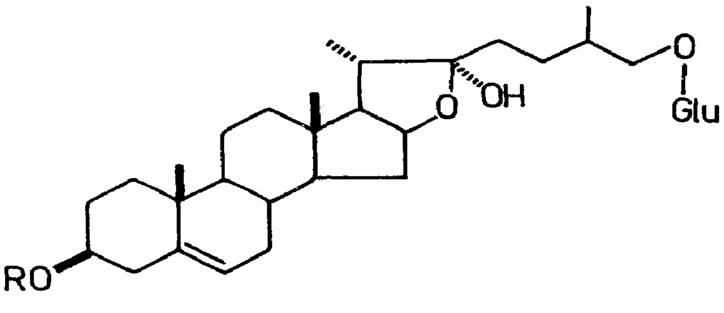
Skimmiwallichin

SMILAX (Smilacaceae)

S. aspera L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 374).

Structure of a 22-hydroxyfurostanol glycoside - asperoside - elucidated (*Chem. Ber.* 1974, *107*, 53).

NEW COMPOUNDS



Asperoside
R = Glu[(2→1)Rha](4→1)Rha(4→1)Rha

SOJA (Papilionaceae)

S. hispida Moench; see *Glycine max* (L.) Merr.

SOLANUM (Solanaceae)

S. aculeatissimum Jacq. syn. *S. khasianum* Clarke, *S. myriacanthum* Dunal (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 374).

Plant extract possessed mild sedative, anticonvulsant and antiovulatory activities; it contained some biogenic amines like histamine and acetylcholine; it provided protection against electroshock seizures in rats and mice and produced transient fall in blood pressure (*J. Res. Indian Med.* 1971, *6*, 125).

Solasodine isolated from ripe berries (*Indian J. Pharm.* 1971, *33*, 54); solasodine identified in ripe fruits collected in Guatemala (*Phytochemistry* 1977, *16*, 1128; *Lloydia* 1977, *40*, 217); *β*-sitosterol, lanosterol, diosgenin and solasodine isolated from mature fruits (*Pharmazie* 1979, *34*, 290; *Chem. Abstr.* 1979, *91*, 87365 y).

S. aethiopicum L.

Betulin and sitosterol glucoside isolated from berries (*Planta Med.* 1974, *25*, 216).

Distribution : Distributed in tropical Africa, introduced into India at Regional Research Laboratory, Srinagar.

S. aviculare Forst.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 375).

Determination of solasonine, solamargine and solasodine by quantitative TLC (*Khim. Farm. Zh.* 1976, *10*, 116; *Chem. Abstr.* 1977, *86*, 127147 j).

S. dulcamara L. syn. *S. persicum* Willd. ex R. & S. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 375).

Two steroid sapogenins - soladulcidine and tigogenin - isolated from aerial parts (*Sb. Nauch. Tr. Vitebsk. Gos. Med. Inst.* 1969, No. 13, 53; *Chem. Abstr.* 1971, *74*, 121342 z); tomatidine, tomatidenol, soladulcidine and solasodine isolated from roots (*Planta Med.* 1970, *18*, 354); aerial parts yielded *α*- and *β*-soladulcine (*Khim. Prir. Soedin.* 1971, *7*, 207; *Chem. Abstr.* 1971, *75*, 31316 k); 3,4-dehydrolycopen-16-al isolated from ripe berries (*Acta Chim.* 1972, *71*, 381; *Chem. Abstr.* 1972, *76*, 85961 f); solasonine and solamargine isolated from leaves (*Khim. Prir. Soedin.* 1974, *10*, 109: *Chem. Abstr.* 1974, *81*, 60822 b); cycloartenol, 24-methylenecycloartanol, cycloeucalenol, obtusifoliol, lophenol, 24-methylenelophenol and 24-ethylidenelophenol along with cholesterol, *β*-sitosterol, stigmasterol, campesterol, brassicasterol, isofucosterol and 24-methylenecholesterol isolated from leaves; all other compounds except cycloartanol also existed as esters (*Planta Med.* 1974, *25*, 115; *Herba Hung.* 1976, *15*, 19; *Chem. Abstr.* 1976, *85*, 2535 g); monosaccharide components of *α*- and *β*-soladulcines consisted of D-galactose, D-glucose and D-xylose and D-galactose, D-glucose and L-rhamnose respectively (*Fitokhim. Izuch. Flory BSSR Biofarm. Issled. Lok. Prep.* 1975, 98; *Chem. Abstr.* 1978, *88*, 186101 d); glycoalkaloid - solapersine, mp. 282° - isolated; its aglycone identified as solasodine (*Khim. Prir. Soedin.* 1975, *11*, 434; *Chem. Abstr.* 1976, *84*, 40726 g).

S. elaeagnifolium Cav.

Eng. - White horse nettle.

Solasurine and solamargine isolated from ripe berries (*J. Inst. Chemists,* Calcutta 1971, *43*, 116; *Chem. Abstr.* 1972, *76*, 1802 u).

S. erianthum D. Don syn. *S. verbascifolium* auct. (non L.) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 230).

Solasodine (57.0, 71.0), solasodiene (3.0, 3.5), diosgenin (8.5, 25.0%) and solafloridine (8.0, tr%) isolated from leaves and stems respectively; in addition tomatidenol (23.0%), vespertilin and 5,16-dehydropregnenolone present in leaves; alkaloids and steroids comprised 0.246% of leaf resin and 0.142% of stem resin (*Pharmazie* 1976, *31*, 656; *Chem. Abstr.* 1976, *85*, 174327 g).

S. ferox L.; see *S. stramoniifolium* Jacq.

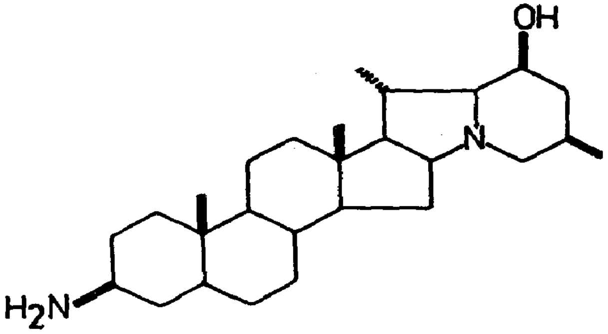
S. giganteum Jacq.

Mar. - Kutri; Tam. - Putharichunda; Mal. - Cheruchunda, Putharichunda.

Structure of a new 3-amino-22-βH-solanidine - solanogantine - confirmed by synthesis (*Tetrahedron Lett.* 1977, 645).

Distribution : Western Ghats and hills of south India, alt. 300- 2000 m. Planted for shade in cardamon plantations in Kerala.

NEW COMPOUNDS

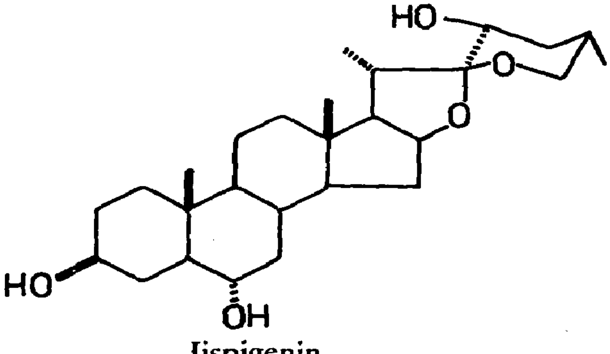


Solanogantine

S. hispidum Pers. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 377).

A new spirostane genin - hispigenin - along with neochlorogenin and paniculogenin isolated after hydrolysis of glycosides (*Tetrahedron Lett.* 1978, 3875).

NEW COMPOUNDS



Hispigenin

S. incanum L.; see *S. melongena* L. var. *incanum* (L.) O. Ktze.

S. jasminoides Paxt.

Eng. - Potato creeper.

Solasonine and solamargine detected in berries (*Planta Med.* 1977, *31*, 212); solasodine present in different parts, maximum amount in leaves (0.52%) (*Planta Med.* 1977, *32*, 233); dios, cholesterol and β-sitosterol isolated from flowers and roots (*J. Nat. Prod.* 1977, *42*, 301); sitosterol and cholesterol also present in aerial parts but diosgenin absent (*J. Nat. Prod.* 1979, *42*, 421).

Distribution : Native of South America, grown in Indian gardens.

S. khasianum Clarke; see *S. aculeatissimum* Jacq.

S. khasianum Clarke var. *chatterjeeanum* Sen Gupta; see *S. viarum* Dunal

S. lycopersicum L.; see *Lycopersicon lycopersicum* (L.) Karsten

S. melongena L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 377).

γ-Hydroxyglutamic acid isolated (*Curr. Sci.* 1972, *41*, 681); lanost-8-en-3β-ol (15.0), lanosterol (tr) and 24-methylene lanost-8-en-3β-ol (tr), in addition to cycloartanol (69.0), cycloartenol (7.0%), 24-methylenecycloartanol, lupeol, β-amyrin, daturaolone and daturadiol determined in 4,4-dimethylsterol fraction from seeds (*Phytochemistry* 1977, *16*, 1732); approximate composition of 4α-methylsterols in unsaponifiable matter of seed oil determined as 31-norlanost-8-enol (2.0), 31-norlanosterol (1.0), 4α-methylcholest-8-enol (1.0), lophenol (13.0), 24-methyllophenol (4.0), 24-ethyllophenol (65.0), gramisterol (3.0), citrostadienol (8.0) and 4α-methyl-24-ethylcholesta-7,24-dienol (1.0%) and 31-norcycloartanol, 31-norcycloartenol, cycloeucalenol, 31-norlanost-9(11)-enol, 24-methyl-31-norlanost-9(11)enol and 4α,24-dimethylcholesta-7,24-dienol (all in tr) (*Phytochemistry* 1978, *17*, 971); four phenolic amides - N-trans-feruloyltyramine, N-trans-p-coumaroyltyramine, N-trans-feruloyloctopamine and N-trans-p-coumaroyloctopamine - along with vanillin, isoscopoletin, ethyl caffeate, trans-ferulic acid and p-aminobenzaldehyde isolated (*Agric. Biol. Chem.* 1978, *42*, 623; *Chem. Abstr.* 1978, *89*, 20276 k); 4-ethylcatechol, trans-caffeic, hydrocaffeic, protocatechuic and chlorogenic acids obtained from leaves (*Nippon Nogei Kagaku Kaishi* 1978, *52*, 101; *Chem. Abstr.* 1978, *89*, 3145 z).

S. melongena L. var. *incanum* (L.) O. Ktze. syn. *S. incanum* L. (*Compend. Indian Med. Plants*, Vol, 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 377).

Diosgenin and yamogenin isolated in 1.2% yield from fruits (*Lloydia* 1977, *40*, 406).

S. myriacanthum Dunal; see *S. aculeatissimum* Jacq.

S. nigrum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 377).

Solasodine and solasodiene obtained as aglycones of steroidal glycosides of berries;

tigogenin and diosgenin also isolated (*J. Indian Chem. Soc.* 1970, *47*, 717); solasonine, solamargine and β-solamargine isolated (*Khim. Prir. Soedin.* 1971, *7*, 674; *Chem. Abstr.* 1972, *76*, 83530 r); solasodine content in stems, leaves and berries 0.02, 0.03 and 0.7% respectively; stems and leaves contained α-solasonine and α-solamargine and berries in addition contained β-solamargine (*Fitokhim. Izuch. Flory BSSR Biofarm. Issled. Lek. Prep.* 1975, *97*; *Chem. Abstr.* 1978, *89*, 3153 a); leaves contained highest tigogenin content (0.5%) (*Biol. Akt. Veshchestva Flory Gruz.* 1976, 9; *Chem. Abstr.* 1978, *89*, 143386 d); dry fruits contained chlorogenic (0.06), caffeic (0.02), traces of neochlorogenic and isochlorogenic acids and caffeoylglucose (0.01%) (*Leather Sci.* 1976, *23*, 401; *Chem. Abstr.* 1977, *87*, 98856 c); diploid, tetraploid and hexaploid varieties of plant analysed for solasodine and diosgenin; diploid showed presence of these compounds (0.65 and 1.2% respectively) (*Indian J. Exp. Biol.* 1977, *15*, 808); solasodine (0.02%) present in roots of Nepalese plant (*Plant. Med. Phytother.* 1977, *11*, 40; *Chem. Abstr.* 1977, *86*, 185969 q).

S. persicum Willd. ex R. & S.; see *S. dulcamara* L.

S. platanifolium Hook.

Solasonine and solatifoline isolated from roots, stems, leaves and seeds (*Phytochemistry* 1975, *14*, 2096); C_{20}-C_{35} n-alkanes, C_{25}-C_{28} n-alkanols and a mixture of sterols and triterpenoids isolated (*Trans. Ill. State Acad. Sci.* 1976, *69*, 114; *Chem. Abstr.* 1977, *86*, 136374 h).

Distribution : Himachal Pradesh, alt. 1000-1500 m.

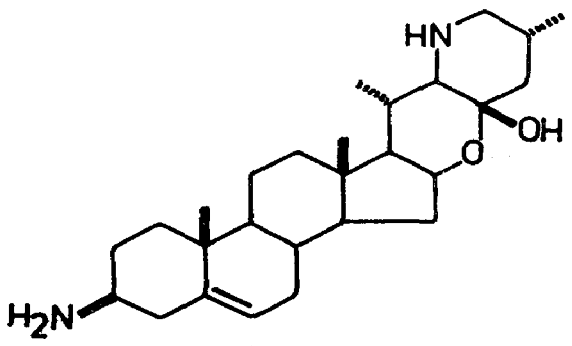
S. seaforthianum Andr.

Eng. - Potato creeper.

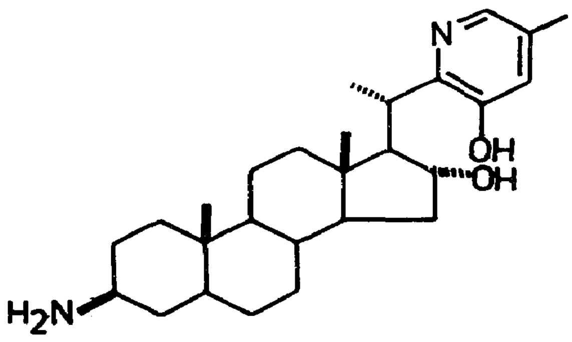
A new steroidal alkaloid - solanoforthine - isolated and its structure determined (*Tetrahedron* 1977, *33*, 1371); structures determined of two 3-amino-20-pyridylpregnanes - solaseaforthine and isosolaseaforthine - isolated along with their 5,6-dehydro analogues (*Tetrahedron Lett.* 1978, 3871).

Distribution : Native of Brazil, grown in gardens throughout plains of India and hills upto 1500 m. Naturalised in Mount Abu.

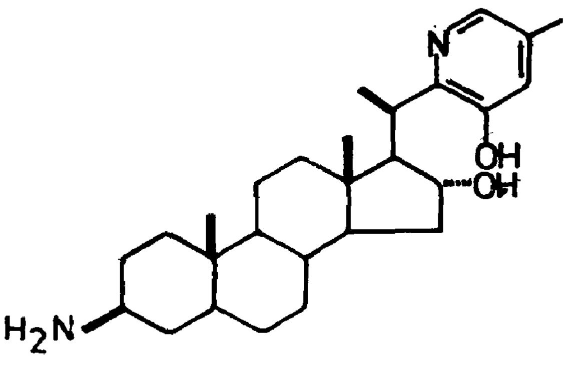
NEW COMPOUNDS



Solanoforthine



Solaseaforthine



Isosolaseaforthine

S. stramoniifolium Jacq. syn. *S. ferox* auct. (non L.) (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 379).

BIOLOGICAL ACTIVITY

Solanine hydrochloride (25 mg/kg, i.v.) administered to guinea pigs thrice every alternate day protected them against its lethal dose (40 mg/kg) (antitoxic immunity). At 0.1 mg/kg, it inhibited sensitivity of guinea pigs to horse serum when given 48-72 hr before serum injection (*Zh. Ushn. Nos. Gorl. Bolenz.* 1977, 64; *Chem. Abstr.* 1978, *88*, 424 h).

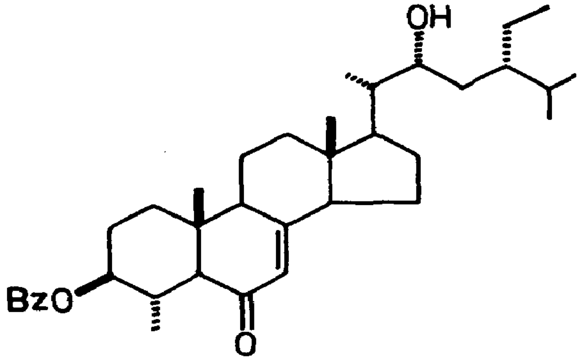
S. surattense Burm.f. syn. *S. xanthocarpum* Schrad. & Wendl. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 379).

Pharmacognostic studies of root and stem (*J. Res. Indian Med.* 1971, *6*, 143).

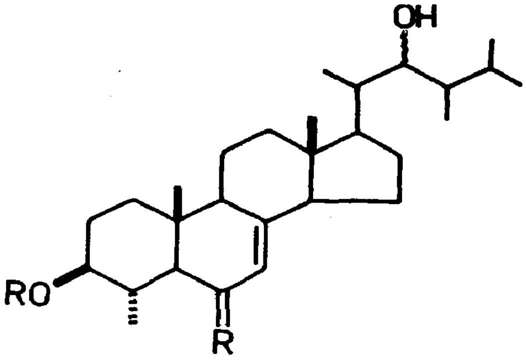
Plant powder is anti-tussive and its beneficial effect in patients of bronchial asthma and non-specific cough has been explained as due to depletion of histamine from lung and its expectorant action as due to inorganic nitrate content (*J. Res. Indian Med.* 1971, *6*, 200).

A new sterol - carpesterol - characterised as (22R)22-hydroxy-6-oxo-4α-methyl-5α-stigmast-7-en-3β-yl benzoate (*J. Org. Chem.* 1971, *36*, 3946); scopoletin, esculin and esculetin isolated (*Planta Med.* 1972, *22*, 184); solasodine,solasonine,solamargine and β-solamargine in fruits of Nepalese plant (*Plant.Med. Phytother.* 1974, *8*, 263; *Chem. Abstr.* 1975, *83*, 75340 h; *Sci. Cult.* 1978, *44*, 190); two new sterols - norcarpesterol (22ξ-hydroxy-6-oxo-4α-methyl-24ξ-methylcholest-7-en-3β-yl benzoate) and 4α-methyl-24ξ-methylcholest-7-en-3β,22ξ-diol (I) isolated (*Phytochemistry* 1975, *14*, 1679); dry fruits contained traces of isochlorogenic, neochlorogenic and chlorogenic acids and caffeic acid (0.035%) (*Leather Sci.* 1976, *23*, 401; *Chem. Abstr.* 1977, *87*, 98856 c); quercetin-3-O-β-D-glucopyranosyl-(1→4)-mannopyranoside isolated together with apigenin and sitosterol (*Phytochemistry* 1978, *17*, 2138).

NEW COMPOUNDS



Carpesterol

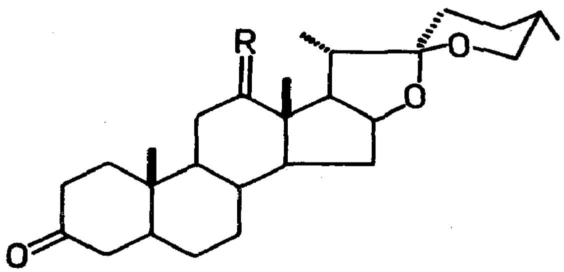


Norcarpesterol
R = benzoyl, R′ = O
I
R = H, R′ = H,H

S. torvum Swartz (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 379).

Steroidal sapogenins - sisalagenone and torvogenin - obtained after acid hydrolysis of fruit extract (*Rev. Latinoam. Quim.* 1970, *1*, 1; *Chem. Abstr.* 1971, *74*, 95459 w).

NEW COMPOUNDS



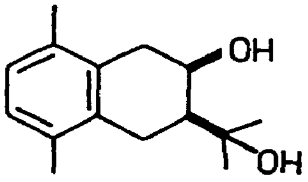
Sisalagenone
R = O
Torvogenin
R = α-H, β-H

S. tuberosum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 379).

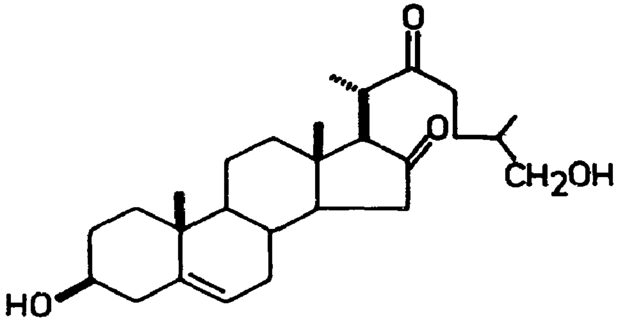
Absolute structure and synthesis of rishitinol, isolated from *Phytophlora*-infected tubers (*Bull. Chem. Soc. Jpn.* 1972, *45*, 2871); an arabinogalactan composed mainly of (1→4) linked arabinose residues isolated (*Carbohydr. Res.* 1972, *22*, 212; *Chem. Abstr.* 1972, *77*, 5736 u); trisaccharide component of kaempferol-3-triglucoside-7-rhamnoside, isolated from seeds, identified as sophorotriose (glycosyl-β1→2 glucosyl-β1→2 glucose) (*Phytochemistry* 1973, *12*, 2269); barogenin, isolated from buds, characterised as (25S) epimer of kryptogenin

(*Phytochemistry* 1977, *16*, 791); chlorogenic, neochlorogenic, isochlorogenic and 1-caffeoylquinic acids and glycosides of quercetin isolated from leaves (*Vestsi Akad. Navuk BSSR, Ser. Biyal. Navuk* 1978, 16; *Chem. Abstr.* 1978, *89*, 176362 w).

NEW COMPOUNDS



Rishitinol



Barogenin

BIOLOGICAL ACTIVITY

Glycoalkaloids tested for cardiotonic activities and compared with k-strophanthoside in isolated frog heart; order of potency: k-strophanthoside > tomantines > solanine > solanidine (*Res. Commun. Chem. Pathol. Pharmacol.* 1976, *15*, 601; *Chem. Abstr.* 1977, *86*, 37500 q).

S. verbascifolium L.; see *S. erianthum* D. Don

S. viarum Dunal syn. *S. khasianum* Clarke var. *chatterjeeanum* Sen Gupta

Three glycoalkaloids - solasurine, solamargine and solasonine- isolated from ripe berries (*J. Inst. Chemists,* Calcutta 1971, *43*, 116; *Chem. Abstr.* 1972, *76*, 1802 u); solamargine, solasonine, solasodine and two steroidal sapogenins isolated from roots (*Rev. Fac. Farm. Odontol. Araraquara* 1976, *10*, 329; *Chem. Abstr.* 1978, *89*, 143373 x).

Distribution : Meghalaya, Arunachal Pradesh, Sikkim, West Bengal, Orissa, Upper Gangetic plain and Nilgiris ascending to 1600 m.

S. xanthocarpum Schrad. & Wendl.; see *S. surattense* Burm.f.

SOLENA (Cucurbitaceae)

S. amplexicaulis (Lamk.) Gandhi syn. *Melothria heterophylla* (Lour.) Cogn., *Zehneria umbellata* (Klein. ex Willd.) Thw., *Z. umbellata* (Klein. ex Willd.) Thw. var. *nepalensis* (Ser.) Clarke (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 164).

A steroid and a mixture of lignoceric, tricosanoic and behenic acids isolated (*Bull. Inst. Chem. Acad. Sin.* 1977, *24*, 51; *Chem. Abstr.* 1977, *87*, 19027 g).

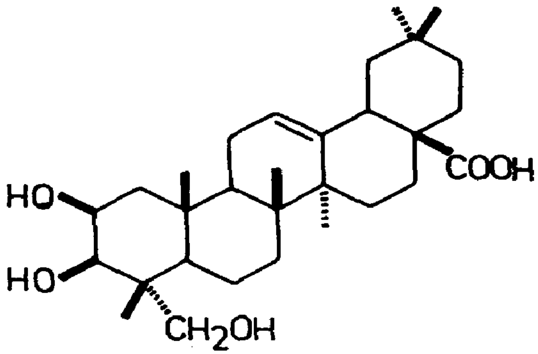
SOLIDAGO (Asteraceae)

S. canadensis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 380).

Saponins shown to contain glucose, xylose and rhamnose and eleven sapogenins A-K, of

which sapogenin D identified as oleanolic acid and sapogenin H as bayogenin (2β,3β,23-trihydroxyolean-12-en-28-oic acid (*Pharmazie* 1975, *30*, 619; *Chem. Abstr.* 1975, *83*, 190377 n).

NEW COMPOUNDS



Bayogenin

S. virgaurea L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 381).

Benzyl 2,6-dimethoxybenzoate isolated (*Acta Chem. Scand.* 1971, *25*, 1924).

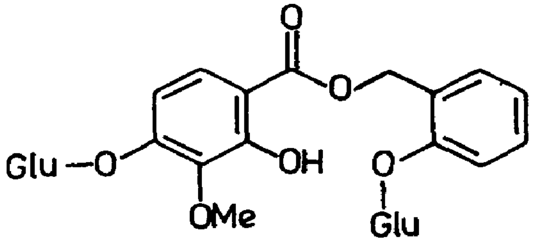
S. virgaurea L. var. *leiocarpa* (Benth.) Gray; see *S. virgaurea* L. ssp. *leiocarpa* (Benth.) Hulten

S. virgaurea L. ssp. *leiocarpa* (Benth.) Hulten syn. *S. virgaurea* L. var *leiocarpa* (Benth.) Gray

Leiocarposide isolated as main constituent of saponin mixture from aerial parts (*Pharmazie* 1979, *34*, 360; *Chem. Abstr.* 1979, *91*, 189765 w).

Distribution : Himalayas from Kashmir to Nepal, alt. 1500-2700 m.

NEW COMPOUNDS



Leiocarposide

BIOLOGICAL ACTIVITY

Leiocarposide showed haemolytic activity (*Pharmazie* 1979, *34*, 360; *Chem. Abstr.* 1979, *91*, 189765 w).

SONCHUS (Asteraceae)

S. asper (L.) Hill (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 230).

Epifriedelinol acetate, stigmasterol and apigenin and luteolin along with their 7-glucuronides isolated (*Indian J. Pharm. Sci.* 1978, *40*, 209).

SONNERATIA (Lythraceae)

S. apetala Buch.-Ham. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 381).

Triacontanol, β-sitosterol, stigmasterol, ursolic acid and β-amyrin isolated from leaves and bark; taraxerol also isolated from bark (*Trans. Bose Res. Inst.* Calcutta 1978, *41*, 13; *Chem. Abstr.* 1979, *91*, 35731 v; *J. Indian Chem. Soc.* 1979, *56*, 218).

SOPHORA (Papilionaceae)

S. mollis (Royle) Baker (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 231).

Biochanin A isolated from heartwood (*Curr. Sci.* 1972, *41*, 414).

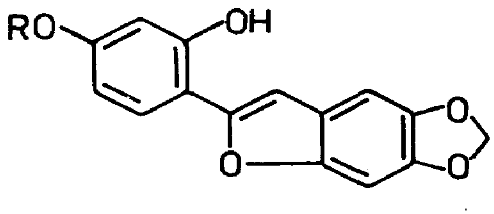
BIOLOGICAL ACTIVITY

Biochanin A showed estrogenic activity (*Curr. Sci.* 1972, *41*, 414).

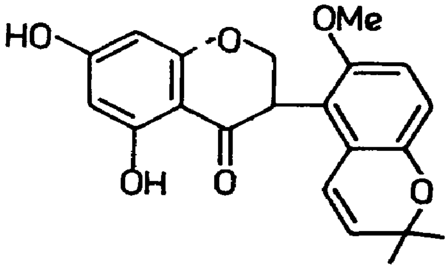
S. tomentosa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 382).

Anagyrine, N-acetylcytisine, baptifoline and oxymatrine isolated from aerial parts (*Phytochemistry* 1974, *13*, 1016); a new 3-hydroxyflavanone - sophoronol - isolated from roots and its structure determined (*Gazz. Chim. Ital.* 1976, *106*, 935; *Chem. Abstr.* 1977, *86*, 155456 c); a new diprenylated isoflavanone - isosophoranone - along with isosophoronol isolated and characterised (*Gazz. Chim. Ital.* 1977, *107*, 189; *Chem. Abstr.* 1977, *87*, 148671 m; *Chem. Pharm. Bull.* 1978, *26*, 3863); two new flavonoids - sophoraisoflavanone A, mp. 178° and sophoraflavanone B, mp. 193° - along with isobavachin and 1-octadecyl caffeate, mp. 108°, isolated from aerial parts (*Chem. Pharm. Bull.* 1978, *26*, 3863); two new benzofuran derivatives - I, mp. 235° and II, mp. 179° - along with l-maackiain, stigmasterol, medicagol, formononetin and 2′,4′,4-trihydroxychalcone (isoliquiritigenin) isolated from aerial parts; structures of I and II determined as 2-(2′,4′-dihydroxyphenyl)-5,6-methylenedioxybenzofuran and 2-(2′-hydroxy-4′-methoxyphenyl)-5,6-methylenedioxybenzofuran respectively (*Chem. Pharm. Bull.* 1978, *26*, 1274).

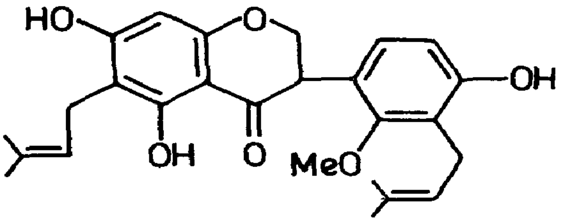
NEW COMPOUNDS



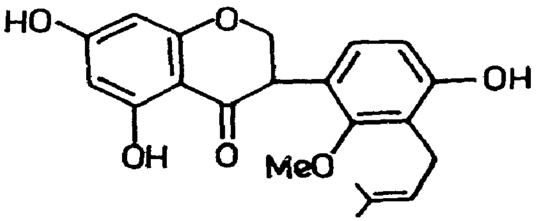
I
R = H
II
R = Me



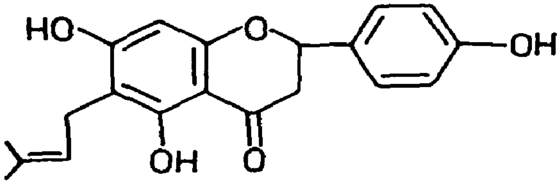
Isosophoronol



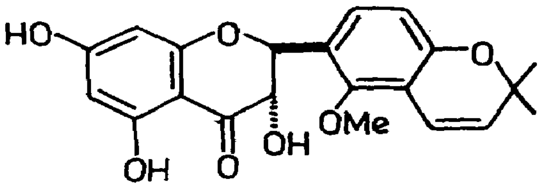
Isosophoranone



Sophoraisoflavanone A



Sophoraflavanone B



Sophoronol

BIOLOGICAL ACTIVITY

Sophoraisoflavanone A exhibited antifungal activity (*Chem. Pharm. Bull.* 1978, *26*, 3863).

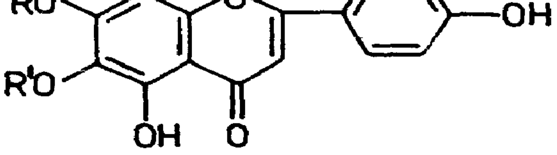
SORBARIA (Rosaceae)

S. sorbifolia (L.) A.Br.; see *S. tomentosa* (Lindl.) Rehder

S. tomentosa (Lindl.) Rehder syn. *S. sorbifolia* (L.) A.Br., *Spiraea sorbifolia* sensu Hook.f. (non L.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 382).

A new flavone glycoside - sorbifolin, mp. 230° - isolated from leaves and its structure elucidated as scutellarein-7-O-[β-D-xylopyranosyl(1→4)]-α-L-rhamnopyranoside (*Khim. Prir. Soedin.* 1969, 5, 322; *Chem. Abstr.* 1970, 72, 39766 r; *Khim. Prir. Soedin.* 1969, 5, 504; *Chem. Abstr.* 1970, *73*, 15164 n); astragalin, arbutin, isorhamnetin-3-glucoside, kaempferol-3-arabinofuranoside, scutellarein and its 7-O-α-L-rhamnopyranoside and chlorogenic acid isolated from flowers and leaves (*Khim. Prir. Soedin.* 1969, 5, 598; *Chem. Abstr.* 1970, *73*, 84623 y); a new glycoside - flavosorbin - isolated and characterised (*Khim. Prir. Soedin.* 1974, *10*, 91; *Chem. Abstr.* 1974, *80*, 121276 e).

NEW COMPOUNDS



Sorbifolin

R = Rha (4→1) Xyl, R' = H

Flavosorbin

R = " R = Rha(4→1)Xyl

SORBUS (Rosaceae)

S. aucuparia L. syn. *Pyrus aucuparia* Gaertn. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 383).

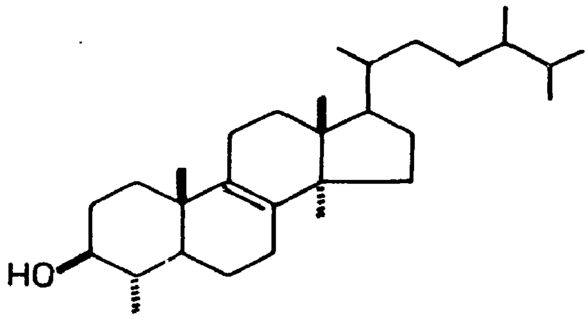
Asozone, isoquercetin, isoquercitrin and meratin isolated from fruits (*Vop. Obshch. Khim. Biokhim.* 1970, 68; *Chem. Abstr.* 1972, *77*, 72597 h); caffeic, quinic and chlorogenic acids and their combined derivatives isolated by acid and alkaline hydrolysis of phenolcarboxylic acid fraction from fruits (*Vop. Obshch. Khim. Biokhim.* 1970, 71; *Chem. Abstr.* 1972, *77*, 72596 m); naringin, (-)epigallocatechin gallate, (-)epigallocatechin, gallic acid and phloroglucinol present in fruits (*Vop. Obshch. Khim. Biokhim.* 1970, 63; *Chem. Abstr.* 1972, *77*, 72592 g); quercetin-3β-D-glucoside, quercetin-3β-D-sophoroside and 3,5,7,4′-tetrahydroxy-8-methoxyflavone-3β-D-glucoside isolated from flowers (*Rocz. Chem.* 1973, *47*, 1629; *Chem. Abstr.* 1974, *80*, 45668 s); α-carotene (6.2), neo-β-carotene (3.3), β-carotene (3.8), polycopene (1.4) and ξ-carotene (1.6 mg%) obtained from fruits (*Khim. Prir. Soedin.* 1978, *14*, 528; *Chem. Abstr.* 1978, *89*, 211935 j); ursolic acid isolated from fruits (*Khim. Prir. Soedin.* 1979, *15*, 412; *Chem. Abstr.* 1979, *91*, 207411 j); detection of malic, citric, tartaric, caffeic and chlorogenic acids in fruits by PC (*Rastit. Resur.* 1979, *15*, 451; *Chem. Abstr.* 1979, *91*, 137143 x).

SORGHUM (Poaceae)

S. bicolor (L.) Moench syn. *S. vulgare* (L.) Pers., *Andropogon sorghum* Brot. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 383).

24-Dihydroobtusifoliol, 24-methyllophenol and 24-ethyllophenol isolated (*Phytochemistry* 1975, *14*, 1140); hexacosanol, β-sitosterol and glucose isolated from roots (*Quart. J. Crude Drug Res.* 1978, *16*, 119; *Chem. Abstr.* 1979, *90*, 51468 z).

NEW COMPOUNDS



24-Dehydroobtusifoliol

S. vulgare (L.) Pers.; see *S. bicolor* (L.) Moench

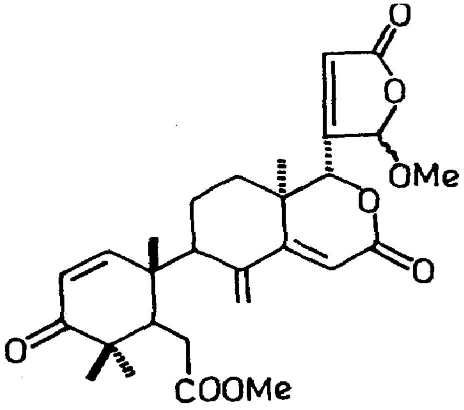
SOYMIDA (Meliaceae)

S. febrifuga A. Juss. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 232).

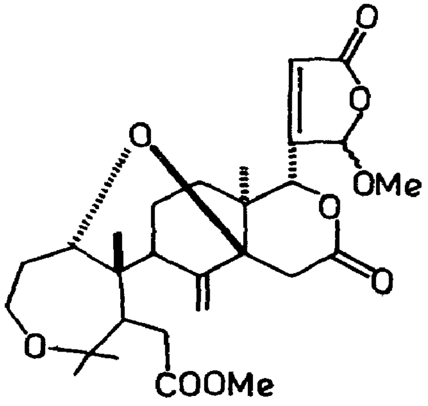
Lupeol, sitosterol and methyl angolensate isolated (*Phytochemistry* 1972, *11*, 1520; *ibid.*

1973, *12*, 1819); in addition, deoxyandirobin isolated from wood and bark (*J. Res. Indian Med.* 1973, *8*, 31); quercetin-3-O-L-rhamnoside and 3-O-rutinoside isolated from leaves (*Indian J. Chem.* 1975, *13*, 527); two new tetranortriterpenoids (I and II) isolated from bark and their structures determined (*J. Chem. Soc.* Perkin 1 1977, 1873); another new tetranortriterpenoid - febrifugin - isolated from heartwood and its structure elucidated (*Indian J. Chem.* 1978, *16*B, 823); naringenin, myricetin, dihydromyricetin and quercetin isolated from heartwood (*Indian J. Chem.* 1979, *17*B, 178).

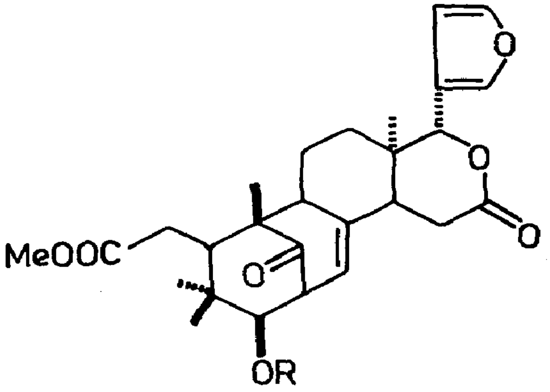
NEW COMPOUNDS



I



II



Febrifugin
R = α-Methylcrotonyl

SPATHODEA (Bignoniaceae)

S. campanulata Beauv.

Eng. - African tulip tree, Squirt tree; H. - Rugtoora; Tel. - Patade, Patadiya; Tam. - Patadi; Kan. - Lujjekaye, Neerukaye.

Quercetin isolated from leaves (*Phytochemistry* 1972, *11*, 1499); caffeic acid isolated from leaves (*Curr. Sci.* 1973, *42*, 403).

Distribution : Native of tropical Africa, introduced into India and planted in gardens and avenues.

SPERMACOCE (Rubiaceae)

S. hispida L.; see *Borreria articularis* (L.f.) F.N. Will.

SPILANTHES (Asteraceae)

S. acmella (L.) Murr.; see *S. calva* DC.

S. calva DC. syn. *S. acmella* auct .[non (L.) Murr.] (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 232).

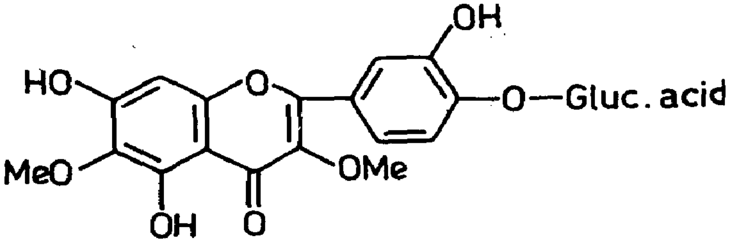
Presence of acetic, lauric, myristic, palmitic, linoleic, and linolenic acid esters of α- and β-amyrins shown; myricyl alcohol, stigmasterol and sitosterol-β-D-glucoside isolated from whole plant (*Phytochemistry* 1975, *14*, 1666).

SPINACIA (Chenopodiaceae)

S. oleracea L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 384).

Stigmasterol, stigmastanol and α-spinasterol isolated from leaves (*Phytochemistry* 1973, *12*, 1180); structure of spinatoside assigned (*Tetrahedron* 1977, *33*, 1405).

NEW COMPOUNDS



Spinatoside

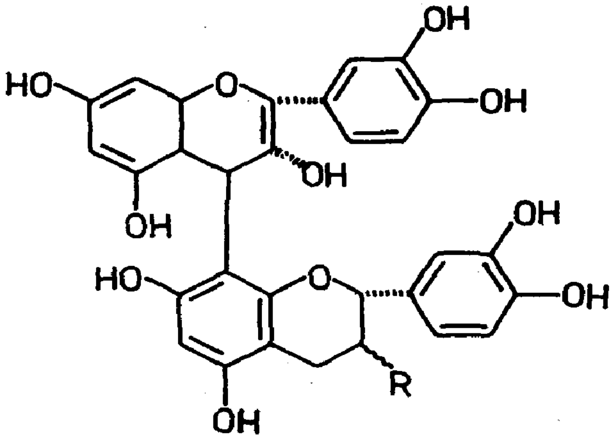
SPIRAEA (Rosaceae)

S. hypericifolia L.

(+)Catechol, (-)epicatechol, (+)catechol rhamnoside and (+)catechol arabinoside isolated from stem (*Khim. Prir. Soedin.* 1974, *10*, 523; *Chem. Abstr.* 1975, *82*, 14010 h); apigenin and luteolin and their 5-β-D-glucopyranosides isolated from stalks (*Khim. Prir. Soedin.* 1975, *11*, 425; *Chem. Abstr.* 1976, *84*, 2236 q); catechol-7-rhamnoside isolated (*Khim. Prir. Soedin.* 1976, *12*, 258; *Chem. Abstr.* 1976, *85*, 108927 b); dimeric flavans (I and II) isolated from bark and root respectively; I consisted of a (-)epicatechol joined by C_4-C_8 bond to a (+)catechol whereas II had two (-)epicatechol units joined by C_4-C_8 bond (*Khim. Prir. Soedin.* 1976, *12*, 735; *Chem. Abstr.* 1977, *86*, 103054 a); catechol-7-xyloside isolated (*Khim. Prir. Soedin.* 1976, *12*, 103; *Chem. Abstr.* 1976, *85*, 43687 b).

Distribution : Nepal Himalayas, alt. 3100 m.

NEW COMPOUNDS



I

R = β-OH

II

R = α-OH

S. sorbifolia L.; see *Sorbaria tomentosa* (Lindl.) Rehder

SPONDIAS (Anacardiaceae)

S. mangifera Willd.; see *S. pinnata* (L.f.) Kurz

S. pinnata (L.f.) Kurz syn. *S. mangifera* Willd. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 233).

β-Amyrin and oleanolic acid isolated from fruits (*J. Inst. Chemists*, Calcutta 1976, *48*, 299; *Chem. Abstr.* 1977, *87*, 18994 h); lignoceric acid, 24-methylenecycloartanone, stigmast-4-en-3-one, β-sitosterol and its glucoside isolated from aerial parts (*Planta Med.* 1976, 29, 190); glycine, cystine, serine, alanine and leucine present in fruits (*J. Inst. Chemists*, Calcutta 1977, *49*, 107; *Chem. Abstr.* 1977, *87*, 65354 j).

STACHYS (Lamiaceae)

S. palustris L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 233).

α-Amyrin and β-sitosterol isolated (*Farm. Zh.* 1975, *30*, 91; *Chem. Abstr.* 1975, *83*, 175437 p); caffeic, chlorogenic and neochlorogenic acids isolated (*Farm. Zh.* 1975, *30*, 91; *Chem. Abstr.* 1975, *83*, 128661 x).

S. sylvatica L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 233).

6-Hydroxykaurene, 6,18-dihydroxykaurene and a new diterpenoid - stachysic acid - iso-

lated; structure of stachysic acid elucidated as (-)6β-acetoxykaur-16-en-18β-oic acid (*Khim. Prir. Soedin.* 1974, *10*, 447; *Chem. Abstr.* 1975, *82*, 28585 m).

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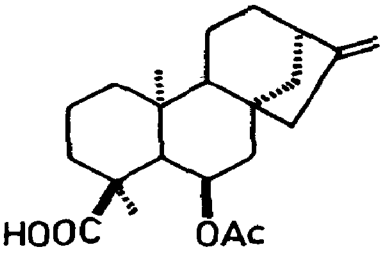


Stachysic acid

STACHYTARPHETA (Verbenaceae)

S. indica Vahl; see *S. jamaicensis* (L.) Vahl

S. jamaicensis (L.) Vahl syn. *S. jamaicensis* (L.) Vahl var. *indica* H.J.Lam., *S. indica* auct. (non Vahl) p.p. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 233).

Ipolamiide isolated from aerial parts (*Phytochemistry* 1975, *14*, 1462); C_{29}-C_{35} saturated n-alkanes, α-spinasterol, a saturated ketone, mp. 73°, a saturated aliphatic carboxylic acid, mp 80° and an unsaturated hydroxycarboxylic acid, mp. 146°, isolated (*Chung-Kuo Nung Yeh Hua Hsueh Hui Chih* 1976, *14*, 151; *Chem. Abstr.* 1977, *86*, 103127 b).

S. jamaicensis (L.) Vahl var. *indica* H.J.Lam.; see *S. jamaicensis* (L.) Vahl

S. mutabilis Vahl

Ipolamiide isolated from aerial parts and its structure confirmed (*Plant. Med. Phytother.* 1977, *11*, 303; *Chem. Abstr.* 1978, *89*, 72953 y).

Distribution : Native of tropical America, introduced into India and naturalised in hills of Maharashtra, Karnataka, Kerala and Tamil Nadu; also grown in gardens elsewhere.

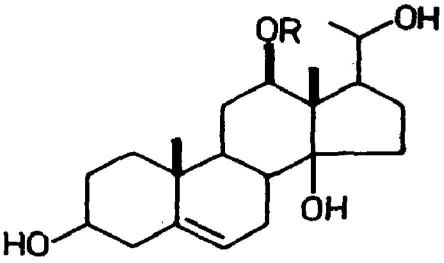
STAPELIA (Asclepiadaceae)

S. grandiflora Masson

Crude glycoside mixture hydrolysed and one of the aglycones characterised as boucerin mixed ester of tiglic and angelic acids (*Chem. Pharm. Bull.* 1974, *22*, 1209).

Distribution : Native of Africa, introduced into Indian gardens as ornamental.

NEW COMPOUNDS



Boucerin tiglate/angelate
R = Tigloyl/angeloyl

STELLARIA (Caryophyllaceae)

S. aquatica (L.) Scop. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 233).

Detection of α-pinene, limonene, camphor, geraniol, n-hexanol, cis-3-hexen-1-ol, 1-octen-3-ol, guaiacol, eugenol and carvacrol in essential oil by GLC (*Nippon Nogei Kagaku Kaishi* 1978, *52*, 335; *Chem. Abstr.* 1979, *90*, 69071 z).

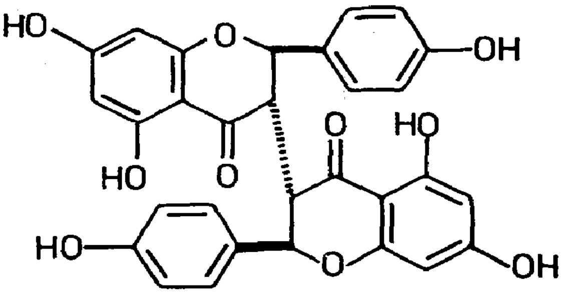
STELLERA (Thymelaeaceae)

S. chamaejasme L.

Isobergapten, pimpinellin, isopimpinellin and sphondin isolated (*Khim. Prir. Soedin.* 1974, *10*, 402; *Chem. Abstr.* 1974, *81*, 117101 x); isolation and structure determination of a biflavanone - chamaejasmine - from roots (*K'o Hsueh T'ung Pao* 1979, *24*, 24; *Chem. Abstr.* 1979, *90*, 135086 m).

Distribution : Western Himalayas, Garhwal and Kumaon, alt. 3000- 3500 m.

NEW COMPOUNDS



Chamaejasmine

STEMODIA (Scrophulariaceae)

S. viscosa Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 233).

Diosmetin, its 7-O-β-D-glucuronide and luteolin-7-O-β-D-glucuronide isolated from

leaves (*Curr. Sci.* 1979, *48*, 67).

STENOLOBIUM (Bignoniaceae)

S. stans (L.) D. Don; see *Tecoma stans* (L.) Juss. ex H. B. & K.

STEPHANIA (Menispermaceae)

S. glabra (Roxb.) Miers syn. *S. rotunda* sensu Hook.f. & Thoms. p.p. (non Lour.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 387).

Tetrahydropalmatine, its tautomer and an alkaloid, mp. 180°, isolated from tubers (*Indian J. Pharm.* 1977, *39*, 36).

BIOLOGICAL ACTIVITY

Stepharine inhibited cholinesterase and pseudo-cholinesterase *in vitro* and increased sensitivity of isolated frog abdominal muscle and rabbit intestine to acetylcholine apparently by inhibiting enzymes. Its MLD in mice was 245 mg/kg, i.v. (*Tr. Vses. Nauch.Issled.Inst. Lek. Rast.* 1971, *14*, 66; *Chem. Abstr.* 1973, *79*, 27310 u).

Cycleanine (50 mg/kg) decreased inflammation, vascular permeability and serum hyaluronidase activity when given i.p. to rats. However, it had no anti-inflammatory activity when given to adrenalectomised rats (*Tr. Vses. Nauch. Issled. Inst. Lek. Rast.* 1971, *14*, 43; *Chem. Abstr.* 1973, *79*, 27308 z).

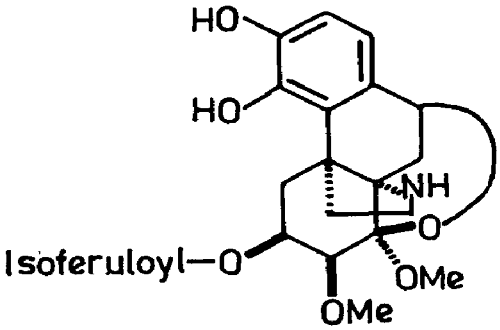
Gindarine hydrochloride produced marked reduction in spontaneous motor activity with no concomitant muscle weakness in rats and mice. It caused hyperthermia in rats and prolonged pentobarbital induced hypnosis in mice (*Indian J. Med. Res.* 1972, *60*, 472). Gindarine showed slight and variable actions on systemic arterial blood pressure, heart rate, cardiac contractility and skeletal muscles. It was devoid of surface anaesthetic activity but produced conduction and infiltration anaesthesia. It antagonised muscarinic actions of acetylcholine in various isolated smooth muscle (rabbit intestine, guinea pig ileum, rat ileum and trachea) preparations. It abolished tonic extensor component of hind limbs in maximal electric shock seizures (*Indian J. Pharmacol.* 1974, *6*, 97). Gindarine hydrochloride reduced fibrillation time in acetylcholine-induced fibrillation by about 7.5% at a dose of 10 mg/kg, i.v., in dog. It also showed mild CNS stimulant activity (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 44).

S. hernandifolia (Willd.) Walp.; see *S. japonica* (Thunb.) Miers

S. japonica (Thunb.) Miers syn. *S. hernandifolia* (Willd.) Walp. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 388).

A new alkaloid - 3-O-dimethylhernandifoline, mp. 148° - isolated (*Khim. Prir. Soedin.* 1972, *8*, 130; *Chem. Abstr.* 1972, *77*, 72561 w); aknadinine, epistephanine, hernandifoline and magnoflorine isolated from aerial parts (*Planta Med.* 1979, *35*, 167).

NEW COMPOUNDS



3-O-Dimethylhernandifoline

BIOLOGICAL ACTIVITY

Epistephanine acted like guanethidine in selectively blocking responses to sympathetic nerve stimulation without affecting responses to adrenergic receptor agonist adrenaline. It showed slower onset and shorter duration of action than guanethidine (*Planta Med.* 1979, *35*, 167).

S. rotunda Lour.; see *S. glabra* (Roxb.) Miers

STEPHEGYNE (Rubiaceae)

S. parvifolia (Roxb.) Korth.; see *Mitragyna parvifolia* (Roxb.) Korth.

S. tubulosa (Arn.) Benth. & Hook.; see *Mitragyna tubulosa* (Arn.) Kuntze

STERCULIA (Sterculaceae)

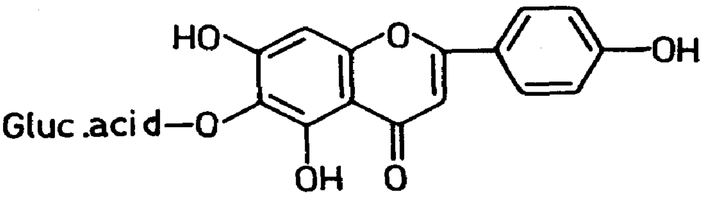
S. balanghas L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 234).

Stigmasterol isolated from bark (*Indian J. Chem.* 1977, *15*B, 291).

S. foetida L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 234).

Isoscutellarin, procyanidin-β-D-glucuronide, 6-O-β-D-glucuronyl luteolin and cyanidin-3-O-glucoside isolated from leaves (*Curr. Sci.* 1977, *46*, 14).

NEW COMPOUNDS



Isoscutellarin

STEREOSPERMUM (Bignoniaceae)

S. chelonoides (L.f.) DC. syn. *S. suaveolens* (Roxb.) DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 234).

Antitumor agent - lapachol - isolated (*Cancer Res.* 1968, *28*, 1952); dinatin-7-glucuronide isolated from leaves (*Phytochemistry* 1972, *11*, 1499); β-sitosterol and n-triacontanol isolated from root bark; root heartwood contained lapachol, dehydro-α-lapachone and dehydrotectol (*J. Indian Chem. Soc.* 1977, *54*, 648).

S. suaveolens (Roxb.) DC.; see *S. chelonoides* (L.f.) DC.

S. xylocarpum Benth. & Hook.f.; see *Radermachera xylocarpa* (Roxb.) K.Schum.

STIPA (Poaceae)

S. capillata L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 235).

Cyanogenic glucoside - triglochinin - isolated (*Proc. K. Ned. Akad. Wet.* Ser. C 1978, *81*, 204; *Chem. Abstr.* 1978, *89*, 56474 n).

STROBILANTHES (Acanthaceae)

S. callosus Nees; see *Carvia callosa* (Nees) Bremek.

STROPHANTHUS (Apocynaceae)

S. gratus Franch. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 392).

Leaves yielded dambonitol (*Phytochemistry* 1971, *10*, 2543); isolation method for saponosides from seeds (*Plant. Med. Phytother.* 1977, *11*, 236; *Chem. Abstr.* 1978, *88*, 117774 p).

BIOLOGICAL ACTIVITY

Ouabain (67 μg/kg, i.v.) when administered in anaesthetised cats produced significant reduction in aqueous humour (AH) formation rate and transport of sodium and chlorine from plasma to AH, without any significant change in outflow facility (*J. Pharmacol. Exp. Ther.* 1970, *175*, 237); it showed biphasic action on Na^+ and K^+ transport in submaxillary glands of dogs; low concentrations stimulated and high concentrations inhibited transport (*J. Pharmacol. Exp. Ther.* 1971, *178*, 616).

Ouabain and acetylstrophanthidin affected carotid sinus baroreceptors leading to dose-dependent neural and cardiovascular changes in decerebrate cats; acetylstrophanthidin was more potent (*J. Pharmacol. Exp. Ther.* 1971, *177*, 650); ouabain increased the apparent volume of calcium distribution in heart by increasing bulk flow of calcium into the cell from extracellular space which may be related to its positive inotropic effect (*J. Pharmacol. Exp. Ther.* 1971, *178*, 259).

Ouabain antagonised contractile response of intestinal smooth muscle induced by his-

tamine, acetylcholine, serotonin and bradykinin (*J. Pharm. Exp. Ther.* 1972, *182*, 378); ouabain infusion (1.6 μg/kg/min) enhanced electrical activity in vagus, sympathetic and phrenic nerves of anaesthetised cats and caused ventricular rhythm disturbances and respiratory hyperactivity (*J. Pharmacol. Exp. Ther.* 1972, *183*, 154); in blood-perfused canine papillary muscle preparation, ouabain induced significant decrease in automaticity in early stage and significant increase (40±2 beats/min) in later stage of infusion (*J. Pharmacol. Exp. Ther.* 1972, *182*, 388); tritiated ouabain (0.08 mg/kg, i.v.) disappeared faster from blood plasma of rats than it did from blood plasma of rabbits and dogs. It was excreted into bile and this species variation in biliary excretion was important factor in resistance of rat to toxic effects of drug (*J. Pharmacol. Exp. Ther.* 1972, *183*, 513).

Ouabain (1 μg/kg/min,i.v.) administration in anaesthetised dog caused increase in force of cardiac contraction within 10 to 20 minutes and saliva potassium concentration also increased by 2 to 5 meq/l (*J. Pharmacol. Exp. Ther.* 1973, *187*, 518); simultaneous observations on excised and blood perfused sino-atrial node and papillary muscle preparations and in situ heart of dogs showed that ouabain induced depression of ventricular automaticity and increase in contractile force as therapeutic effects while sympathetic excitation precipitated ventricular arrhythmias as toxic effect (*J. Pharmacol. Exp. Ther.* 1973, *186*, 463); ouabain when administered to cat perfused submandibular glands *in vitro* caused K^+ efflux and induced salivary secretion (*Pfluegers Arch.* 1974, *350*, 281; *Chem. Abstr.* 1975, *82*, 51398 m); at a dose of 2.5-10 mg/kg, i.p., it prolonged pentobarbitone sleeping time in rats (*Indian J. Physiol. Pharmacol.* 1974, *18*, 140; *Chem. Abstr.* 1975, *82*, 25868 v).

Administration of ouabain (10-30 μg/kg,i.v.) to cat prevented both cardiac arrhythmias and associated hyperactivity on sympathetic nerves. Its subarrhythmic doses (60-80 μg/kg) converted subarrhythmogenic hypothalamic electrical stimulus to threshold stimulus for arrhythmias (*J. Pharmacol. Exp. Ther.* 1975, *195*, 577); ouabain (20 μg, i.c.v.) raised blood pressure by over 50 mm Hg in control rats; this effect was abolished by 0.5 μg/kg of tetrodotoxin (*J. Pharm. Pharmacol.* 1976, *28*, 847); ouabain (0.1 μM) decreased adriamycin (10 μg/ml) uptake by 45% in spontaneously beating isolated guinea pig heart, showing that cardiac glycoside decreases adriamycin toxicity by decreasing cardiac binding of the antibiotic (*IRCS Med. Sci. Libr. Compend.* 1976, *5*, 16; *Chem. Abstr.* 1977, *86*, 83493 n).

Pyretic activity of lipopolysaccharides (LPS) was decreased when ouabain (0.06 mg/kg, i.v.) was administered to rabbit simultaneously with 0.02 μg of LPS. However, it did not influence activity of LPS when LPS was directly injected into cisterna magna. Pyretic activity of cerebrospinal fluid taken 2 hr after injection of ouabain and LPS was less than when LPS was given alone (*Nippon Yakurigaku Zasshi* 1976, *72*, 649; *Chem. Abstr.* 1977, *87*, 47990 j); intracarotid infusion of ouabain (1280 *n*g/min) over 4.5 hr abolished water intake of sheep in response to intracarotid infusion of angiotensin (800 *n*g/min) or 4M sodium chloride (1.6 ml/min) for 20 min (*Pharmacol. Biochem. Behav.* 1977, *7*, 121; *Chem. Abstr.* 1978, *88*, 15919 x).

Ouabain showed a dose-dependent inhibition of membrane repolarisation at 0.01-100 μg/ml, and a positive inotropic effect in isolated electrically (4Hz) stimulated rat atria at more

than 1.0 μg/ml (*C. R. Hebd. Seances Acad. Sci.* Ser. D 1977, *284*, 1819; *Chem. Abstr.* 1977, *87*, 62475 p); ouabain (5 μM) perfusion of isolated rabbit heart elevated resulting tension after 15 min but had no effect on tissue calcium, ATP or creatine phosphate and mitochondrial respiratory activity. Extending duration of perfusion to 60 min resulted in raised tissue calcium and diminished tissue ATP and creatine phosphate (*J. Physiol.* 1978, *275*, 75; *Chem. Abstr.* 1978, *88*, 182507 t).

S. kombe Oliver (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 393).

Periplocymarin, periplocin, cymarin, k-strophanthin-β, erysimoside. k-strophanthoside and six new cardenolides isolated from seeds; three of these, k-strophanthol-γ, strophanthoside-19-carboxylic acid and 17β-H-strophanthoside contained strophanthidol, strophanthidine-19-carboxylic acid and 17β-H-strophanthidine respectively as aglycones and strophanthotriose; another glycoside - neoglucoerysimoside - identified as strophanthidine-3-O-β-D-digitoxopyranosyl-4'-O-β-D-glucopyranoside (*Khim. Prir. Soedin.* 1972, *8*, 180; *Chem. Abstr.* 1972, *77*, 58746 d).

BIOLOGICAL ACTIVITY

Strophanthin (k-strophanthin-β) (0.2 unit/kg) when injected i.v. into dogs 30-40 min after administration of diprasine (5 mg/kg), dimedrol (5 mg/kg) or prednisolone (3 mg/kg) increased blood supply to ischemic portion of myocardium (*Program. Mater. God. Knof. Kursk. Gos. Med. Inst.* 44th 1971, 87; *Chem. Abstr.* 1975, *82*, 25928 q); strophanthin at 0.5 mg/kg, i.p., in rats showed increase in heart muscle glycogen along with a rise in myocardial hexokinase and a drop in glucose-6-phosphatase; skeletal muscles showed decrease in glycogen and hexokinase activity (*Uzb. Biol. Zh.* 1974, *18*, 13; *Chem. Abstr.* 1975, *82*, 11250 a); strophanthin (0.1 mg/100 g, i.m.) lowered total lipids by 6-15% and β-lipoproteins by 22-37% and increased lipolytic activity by 10-19% in myocardium of intact rats; its administration to rats with acute cardiac insufficiency lowered heart β-lipoproteins and normalised (lowered) lipolytic activity; cholesterol also decreased while phospholipids increased (*Farmakol. Toksikol.* 1974, *9*, 20; *Chem. Abstr.* 1975, *82*, 11255 f); acetylstrophanthidin (0.075 mg/kg, i.v.) increased ventricular fibrillation threshold upto a maximum 50% within 30 min, when injected in neurally intact dogs (*Eur. J. Pharmacol.* 1979, *57*, 69).

g-Strophanthin or k-strophanthin (1 capsule 3 times daily) when administered orally to a patient with hypertonicity of cardiogenic type, decreased blood pressure and controlled symptoms (US 4,020,159 (1977), April, 26; *Chem. Abstr.* 1977, *87*, 62865 r).

STRYCHNOS (Strychnaceae)

S. cinnamomifolia Thw.; see *S. wallichiana* Steud. ex DC.

S. colubrina L.; see *S. wallichiana* Steud. ex DC.

S. ignatii Berg. syn. *S. maingayi* Cl. var. *fruticosa* Cl. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 236).

Detection of pseudostrychnine, pseudobrucine, N-cyano-sec.-pseudostrychnine, N-cyano-sec.-pseudocolubrine, strychnine and brucine by TLC (*Phytochemistry* 1974, *13*, 525).

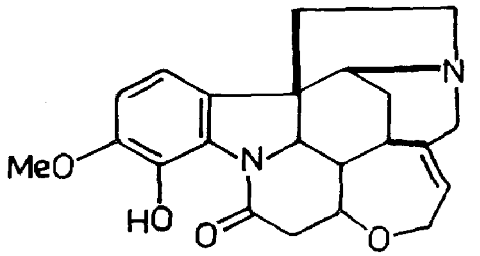
S. maingayi Cl. var. *fruticosa* Cl.; see *S. ignatii* Berg.

S. malaccensis Clarke; see *S. wallichiana* Steud. ex DC.

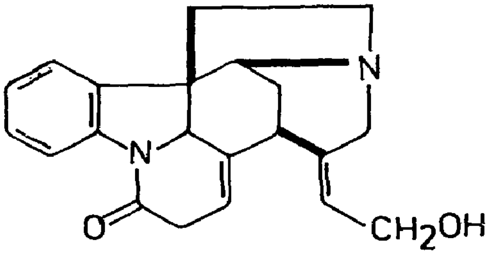
S. nux-vomica L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 395).

Absolute structure of loganin (*Tetrahedron* 1970, *26*, 3905); isolation and characterisation of isostrychnine from seeds (*J. Chromatogr.* 1974, *88*, 416; *Chem. Abstr.* 1974, *80*, 130486 a; *Phytochemistry* 1979, *18*, 512); a new alkaloid - N-methyl-sec.-pseudo-β-colubrine isolated from seeds along with 4-hydroxystrychnine (*Phytochemistry* 1974, *13*, 265; *ibid.* 1979, *18*, 512); improved method for extraction of strychnine and brucine from seeds (*Res. Ind.* 1978, *23*, 224); p-hydroxybenzoic, vanillic, 2-hydroxy-4-methoxybenzoic, sinapic and syringic acids and kaempferol, quercetin and 3′-O-methylquercetin present in plant (*Curr. Sci.* 1979, *48*, 383); a new alkaloid - protostrychnine - isolated along with normacusine B and 4-hydroxy-3-methoxystrychnine and its structure elucidated (*Phytochemistry* 1979, *18*, 512).

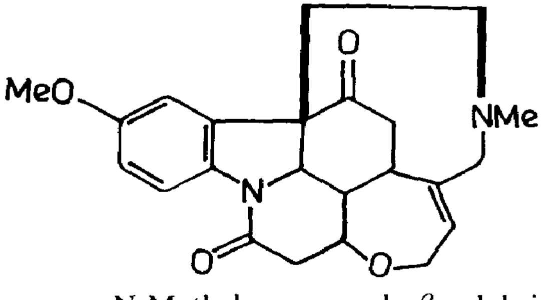
NEW COMPOUNDS



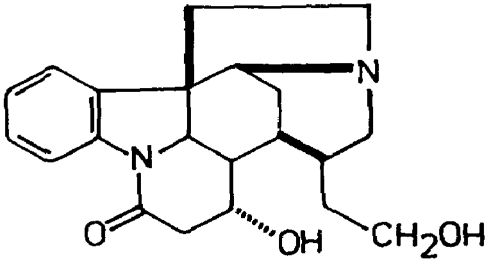
4-Hydroxy-3-methoxystrychnine



Isostrychnine



N-Methyl-sec.-pseudo-β-colubrine



Protostrychnine

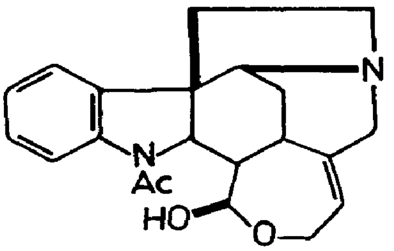
BIOLOGICAL ACTIVITY

Strychnine showed remarkable negative chronotropic activity on frog isolated heart and guinea pig atria. It retained its activity *in vivo* also (open chest dog) (*J. Pharm. Pharmacol.* 1970, *22*, 380); strychnine (50 mg/kg) when injected s.c. increased level of acetylcholine in spinal cord and sustained convulsions in frog for 4 hr (*Brit. J. Pharmacol.* 1972, *45*, 173).

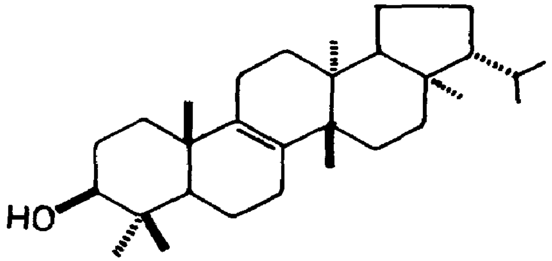
S. potatorum L.f. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 236).

An alkaloid - diaboline - isolated (*Phytochemistry* 1975, *14*, 587); *β*-sitosterol and stigmasterol isolated from seeds (*Planta Med.* 1975, *28*, 392); oleanolic acid and its 3*β*-acetate and a saponin containing oleanolic acid, galactose and mannose isolated from seeds; galactose and mannose also isolated as free sugars (*Planta Med.* 1977, *32*, 362); a new triterpene - isomotiol (fern-8-en-3*β*-ol) - isolated from leaves; mixtures of sitosterol, stigmasterol and campesterol obtained from leaves and bark (*Phytochemistry* 1978, *17*, 154); quercetin and vanillic, syringic, 2-hydroxy-4-methoxybenzoic, chlorogenic and sinapic acids found in plant (*Curr. Sci.* 1979, *48*, 383).

NEW COMPOUNDS



Diaboline



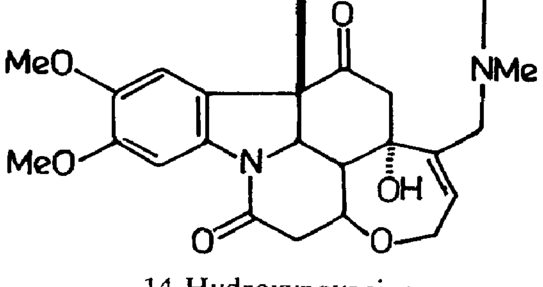
Isomotiol

S. rheedi Clarke; see *S. wallichiana* Steud. ex DC.

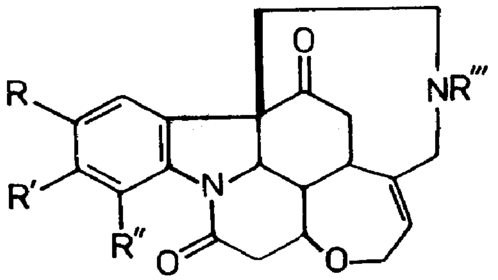
S. wallichiana Steud. ex DC. syn. *S. colubrina* L. (non auct.) nom. cofusum, *S. cinnamomifolia* Thw., *S. rheedi* Clarke, *S. malaccensis* Clarke (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 236).

4-Hydroxy-3-methoxystrychnine and 4-hydroxy-3-methoxy-N-methyl-sec.-pseudostrychnine together with strychnine, 4-hydroxystrychnine, brucine, vomicine and novacine isolated from seeds (*J. Pharm. Pharmacol.* 1973, *25*, 563); N-cyano-sec.-pseudostrychnine and N-cyano-sec.-pseudobrucine isolated from leaves (*Phytochemistry* 1974, *13*, 255); new alkaloids - 14-hydroxynovacine and icajine N-oxide together with icajine, novacine, strychnine, brucine, pseudostrychnine, pseudobrucine, N-methyl-sec.-pseudo-*β*-colubrine, 14-hydroxyicajine, strychnine-N-oxide and brucine-N-oxide isolated from leaves (*Phytochemistry* 1974, *13*, 259).

NEW COMPOUNDS



14-Hydroxynovacine



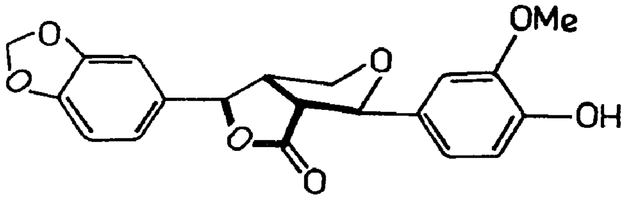
N-Cyano-sec.-pseudostrychnine
R,R′,R″ = H, R‴ = CN
N-Cyano-sec.-pseudobrucine
R,R′ = OMe, R″ = H, R‴ = CN
4-Hydroxy-3-methoxy-N-methyl-sec.-pseudostrychnine
R = H, R′ = OMe, R″ = OH,R‴= Me

STYRAX (Styraceae)

S. officinalis L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 395).

Aqueous and alcoholic extracts showed antitumour activity *in vivo* but were toxic (*Planta Med.* 1973, *24*, 290).

Myristone, ginnone, n-nonacosane, n-octacosane, triacontanol, β-sitosterol and styracitol isolated (*Planta Med.* 1973, *24*, 290); isolation of styracitol and sucrose from fruit peels (*Doga* 1977, *1*, 326; *Chem. Abstr.* 1979, *90*, 36298); a new lignan - styraxin - isolated and its structure elucidated as 2-exo-(3′,4′-methylenedioxyphenyl)-6-exo-(3″-methoxy-4″-hydroxyphenyl)-4-oxo-3,7-dioxabicyclo-(3,3,O)-octane (*Planta Med.* 1978, *34*, 403).
NEW COMPOUNDS



Styraxin

SUREGADA (Euphorbiaceae)

S. bifaria Roxb. syn. *Gelonium bifarium* Roxb.

Bauerenol, multiflorenol, epimultiflorenol and sitosterol isolated from trunk bark (*Phytochemistry* 1973, *12*, 1819).

Distribution : Andaman Islands.

SWERTIA (Gentianaceae)

S. affinis Clarke; see *S. angustifolia* Buch.-Ham. ex D. Don

S. angustifolia Buch.-Ham. ex D. Don syn. *S. angustifolia* Buch.–Ham. ex D. Don var. *pulchella* Burkill, *S. affinis* Clarke, *Ophelia angustifolia* D. Don (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 237).

Bellidifolin, β-sitosterol and ursolic acid isolated (*Planta Med.* 1977, *32*, 280); fourteen tetra-and five penta-oxygenated xanthones, including seven 1-O-glucosides, isolated and characterised - 1,5,8-trihydroxy-3-methoxy-, 1,7,8-trihydroxy-3-methoxy-, 1,3,5,8-tetrahydroxy-, 1,3,7,8-tetrahydroxy-1-hydroxy-2,3,4,7-tetramethoxy-, 1,8-dihydroxy-3,5-dimethoxy-, 1,8-dihydroxy-3,7-dimethoxy-, 1-hydroxy-3,7,8-trimethoxy-(decussatin), 1,3,8-trihydroxy-7-methoxy-, 3-methoxy-1-O-β-D-glucopyranosyl-5,8-dihydroxy-, 3-hydroxy-1-O-β-D-glucopyranosyl-4,5-dimethoxy-, 8-hydroxy-1-O-β-D-glucopyranosyl-3,5-dimethoxy-, 1-O-β-D-glucopyranosyl-3,5,8-trihydroxy-, 1-O-β-D-glucopyranosyl-3,7,8-trihydroxy-, 1-O-β-D-glucopyranosyl- 3,4,5,8-tetrahydroxy-, 1-O-β-D-glucopyranosyl-3,4,7,8-tetra-hydroxy-, 3-methoxy-1-O-β-D-glucopyranosyl-7,8-dihydroxy-, 1,3,4,5,8-pentamethoxy- and 1,3,4,7,8-pentamethoxy-xanthones (*J. Pharm. Sci.* 1978, *67*, 55).

S. angustifolia Buch.-Ham. ex D. Don var. *pulchella* Burkill; see *S. angustifolia* Buch.-Ham. ex D. Don

S. bimaculata Hook.f. & Thoms.

1,3-Dihydroxy-4,5-dimethoxyxanthone and its 1- and 3-O-β-D-glucopyranosides isolated (*Yakugaku Zasshi* 1971, *91*, 1022; *Chem Abstr.* 1972, *76*, 1756 g).

Distribution : Eastern Himalayas, Sikkim and Bhutan, alt. 1500 - 2400 m.

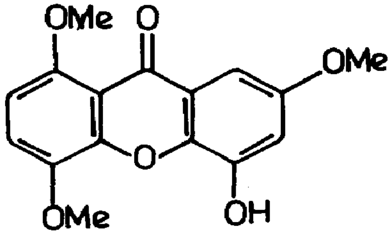
S. chirata (Wall.) Clarke; see *S. chirayita* (Roxb. ex Flem.) Kars.

S. chirayita (Roxb. ex Flem.) Kars. syn *S. chirata* (Wall.) Clarke, *Gentiana chirayita* Roxb. ex Flem. *Ophelia chirata* Griseb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 237).

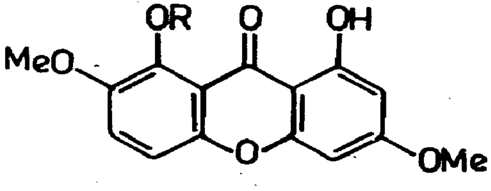
Plant extract is used as effective remedy for chronic fever (*J. Res. Indian Med.* 1973, *8*, 23).

Swertinin, swertianin, swerchirin, decussatin, isobellidifolin, friedelin and β-sitosterol isolated (*J. Res. Indian Med.* 1973, *8*, 23; *Leather Sci.* 1973, *20*, 132; *Chem. Abstr.* 1973, *79*, 113218 b); nine tetraoxygenated xanthones - 1-hydroxy-3,5,8-trimethoxyxanthone (I), 1-hydroxy-3,7-8-trimethoxyxanthone (decussatin) (II), 1,8-dihydroxy-3,7-dimethoxyxanthone (III), 1,8-dihydroxy-3,5-dimethoxyxanthone, 1,3,8-trihydroxy-5-methoxyxanthone, 1,5,8-trihydroxy-3-methoxyxanthone, 1,3,5,8-tetrahydroxyxanthone, 1,3,7,8-tetrahydroxyxanthone and 1,3,6,7-tetrahydroxyxanthone-C2-β-D-glucoside (mangiferin) - isolated from roots and aerial parts (*J. Pharm. Sci.* 1973, *62*, 926).

NEW COMPOUNDS



I



II
R = Me
III
R = H

BIOLOGICAL ACTIVITY

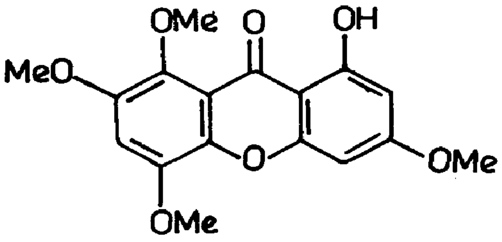
Gentianine showed antipsychotic activity in rats and mice; it diminished spontaneous motility, produced catalepsy and hypothermia, potentiated hexobarbital sleeping time, antagonised amphetamine-induced stereotypy and inhibited induced aggressive behaviour (*J. Pharm. Sci.* 1974, *63*, 1341).

S. ciliata (G. Don) B.L. Burtt syn. *S. purpurascens* Clarke (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 237).

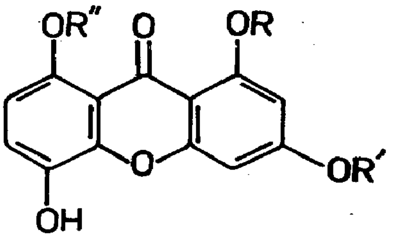
Total xanthone glucosides mixture showed CNS depressant, cardiovascular, stimulant and anticonvulsant activities (*J. Pharm. Sci.* 1974, *63*, 1286).

Oleanolic acid, sitosterol, swertisin and swertiamarin isolated (*Phytochemistry* 1973, *12*, 728); 1-hydroxy-3,5,7,8-tetramethoxyxanthone (I), mp. 198°, and bellidifolin isolated from aerial parts (*Phytochemistry* 1973, *12*, 2542); three tetraoxygenated xanthone-O-glucosides - norswertianolin (3,5,8-trihydroxyxanthone-1-O-glucoside), swertianolin (5,8-dihydroxy-3-methoxyxanthone-1-O-glucoside) and isoswertianolin (1,5-dihydroxy-3-methoxyxanthone-8-O-glucoside) - isolated (*J. Pharm. Sci.* 1974, *63,* 1286).

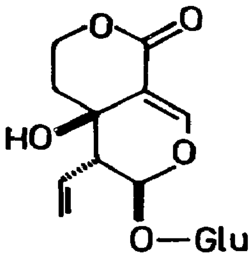
NEW COMPOUNDS



I



Norswertianolin
R = Glu, R′,R″ = H
Swertianolin
R = Glu, R′ = Me, R″ = H
Isoswertianolin
R = H, R′ = Me, R″ = Glu



Swertiamarin

S. decussata Nimmo. ex Grah.; see *S. densiflora* (Griseb.) Kashyappa

S. densiflora (Griseb.) Kashyappa syn. *S. decussata* Nimmo. ex Grah. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 396).

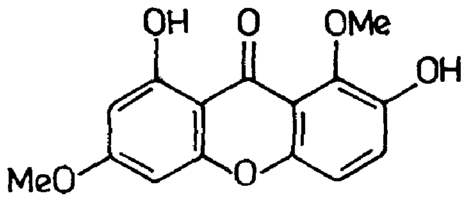
A monohydroxy triterpene, mp. 162°, and a dihydroxy triterpene, mp. 212°, isolated from leaves and flowers which were not characterised (*Indian J. Chem.* 1972, *10,* 769).

S. dilatata Clarke

Gentiacaulein, bellidifolin, demethylbellidifolin, methylbellidifolin, decussatin, swertianin, methylswertianin and norswertianin isolated (*Yakugaku Zasshi* 1974, *94*, 647; *Chem. Abstr.* 1974, *81*, 68429 z).

Distribution : Nepal and Sikkim, alt. 1200-3600 m.

NEW COMPOUNDS



Gentiacaulein

S. gracilescens H. Smith

Bellidifolin, demethylbellidifolin, methylbellidifolin, decussatin, gentiacaulein, swertianin, methylswertianin and norswertianin isolated (*Yakugaku Zasshi* 1974, *94*, 647; *Chem. Abstr.* 1974, *81*, 68429 z).

Distribution : Nepal.

S. nervosa Wall. ex DC.

Bellidifolin, demethylbellidifolin, methylbellidifolin, decussatin, gentiacaulein, swertianin, methylswertianin and norswertianin isolated (*Yakugaku Zasshi* 1974, *94*, 647; *Chem. Abstr.* 1974, *81*, 68429 z).

Distribution : Nepal and Sikkim, alt. 1800-2700 m.

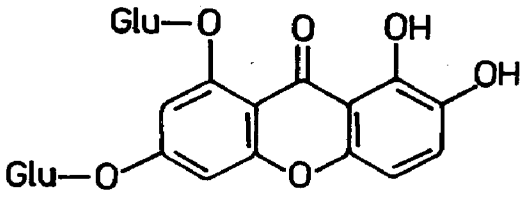
S. paniculata (D. Don) Wall. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 237).

β-Sitosterol, ursolic acid, bellidifolin and hydroxytetramethoxy xanthone isolated from aerial parts (*Planta Med.* 1977, *32*, 280).

S. perennis L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 397).

A new xanthone diglucoside (*I*) isolated from aerial parts and its structure elucidated (*Helv. Chim. Acta* 1977, *60*, 262).

NEW COMPOUNDS



I

S. purpurascens Clarke; see *S. ciliata* (G. Don) B.L. Burtt

S. racemosa Wall. ex DC.

Bellidifolin, demethylbellidifolin, methylbellidifolin, decussatin, gentiacaulein, swertianin, methylswertianin and norswertianin isolated (*Yakugaku Zasshi* 1974, *94*, 647; *Chem. Abstr.* 1974, *81*, 68429 z.).

Distribution : Nepal

S. speciosa D. Don syn. *S. speciosa* D. Don var. *perfoliata* (G. Don) Clarke
H. - Chirayita.

Seven xanthones - 1,7-dihydroxy-3-methoxy-, 1,3-dihydroxy-7-methoxy-, 1-hydroxy-3,7-dimethoxy-, 1,7,8-trihydroxy-3-methoxy-, 1,7-dihydroxy-3,8-dimethoxy-, 1,8-dihydroxy-3,5-dimethoxy-xanthone and mangiferin - isolated (*Bull. Mas. Nat. Hist. Sci. Phys. Chim.* 1977, *13*, 55; *Chem. Abstr.* 1978, *89*, 143342 m).

Distribution : Western Himalayas from Kashmir to Kumaon, alt. 2700-3300 m.

S. speciosa D. Don var. *perfoliata* (G. Don) Clarke; see *S. speciosa* D. Don

SWIETENIA (Meliaceae)

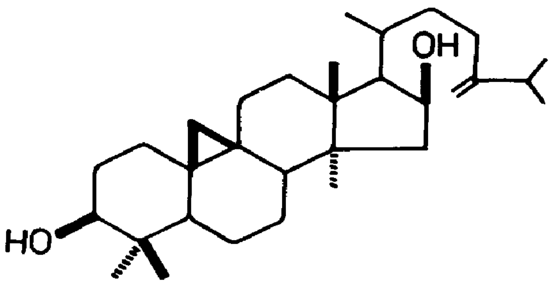
S. macrophylla King (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 397).

Isolation of swietenolide diacetate (*Phytochemistry* 1976, *15*, 429).

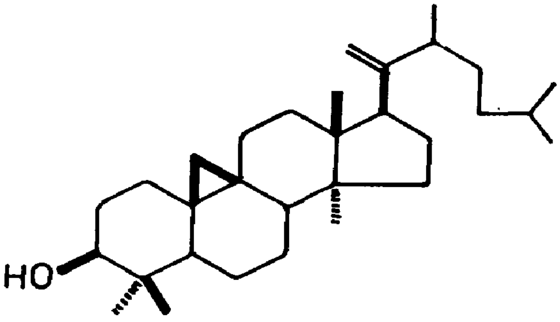
S. mahagoni (L.) Jacq. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 397).

Scopoletin isolated from leaves (*J. Indian Chem. Soc.* 1970, *47*, 722); melianone isolated (*J. Indian Chem. Soc.* 1970, *47*, 501); a new triterpene - cyclomahogenol - isolated from leaves and its structure elucidated (*Phytochemistry* 1971, *10*, 1367); swietenin and stigmasterol glucoside isolated from leaves; a new triterpene - cycloswietenol - isolated from heartwood and characterised; lupeol benzoate, hederagenin, cycloartenol and β-sitosterol also isolated (*Curr. Sci.* 1977, *46*, 141; *Indian J. Chem.* 1978, *16*B, 650).

NEW COMPOUNDS



Cyclomahogenol



Cycloswietenol

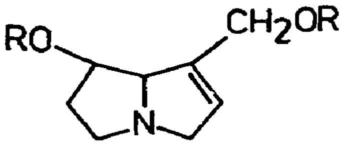
SYMPHYTUM (Boraginaceae)

S. asperum Lepech.

A new alkaloid - asperumine, mp. 135° - isolated and its structure elucidated (*Zh. Obsch. Khim.* 1970, *40*, 2519; *Chem. Abstr.* 1971, *75*, 1243 s).

Distribution : Grown in Indian gardens as an ornamental.

NEW COMPOUNDS



Asperumine
R = α-Methylcrotonyl

SYMPLOCOS (Symplocaceae)

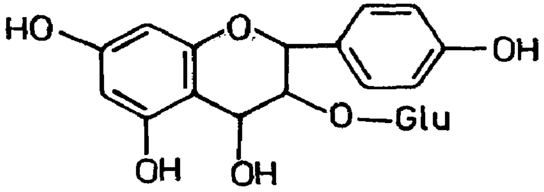
S. cochinchinensis (Lour.) Moore ssp. *laurina* (Retz.) Nooteboom var. *laurina* syn. *S. spicata* Roxb., *S. spicata* Roxb. var. *laurina* (Retz.) Clarke, *S. spicata* Roxb. var. *malasica* Clarke, *S. spicata* Roxb. var. *attenuata* (A. DC.) Clarke

S. - Lodhra; H. - Bholia, Sodh; B. - Buri, Lodh, Bholica; Tam. - Kambli vetti; Mal. - Pachotti; Oriya - Bhaunni; Nep. - Kholme; Lepcha - Gyong, Palyok-kung; Khasi - Dieng-latperit.

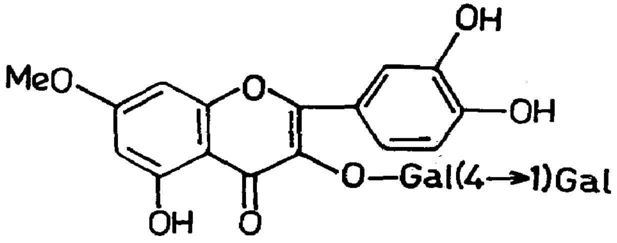
A new glycoside of leucoanthocyanidin (I) isolated from stem bark which on hydrolysis yielded D-glucose and pelargonidin (*Univ. Allahabad. Stud.* (*Chem. Sec.*) 1968, 32; *Chem. Abstr.* 1970, *72*, 55818 q); a new flavonol glycoside - rhamnetin-3-O-β-D-galactosyl-(4→1)O-β-D-galactopyranoside (II), mp. 195° - isolated from leaves (*Phytochemistry* 1976, *15*, 833).

Distribution : North and east India, from Kumaon to Bhutan, Meghalaya and Assam upto 2200 m, Eastern and Western Ghats in peninsular India.

NEW COMPOUNDS



I

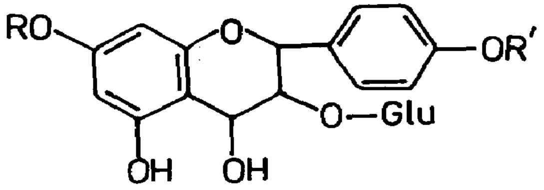


II

S. racemosa Rox (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 237).

Two new monomethyl pelargonidin glucosides (I and II) isolated from trunk bark and characterised; pelargonidin-3-O-glucoside also isolated (*Univ. Allahabad Stud.* (*Chem. Sec.*) 1968, 32; *Chem. Abstr.* 1970, *72*, 55818 q).

NEW COMPOUNDS



I
R = Me, R′ = H
II
R = H, R′ = Me

S. spicata Roxb.; see *S. cochinchinensis* (Lour.) Moore ssp. *laurina* (Retz.) Nooteboom var. *laurina*

S. spicata Roxb. var. *attenuata* (A. DC.) Clarke; see *S. cochinchinensis* (Lour.) Moore ssp. *laurina* (Retz.) Nooteboom var. *laurina*

S. spicata Roxb. var. *laurina* (Retz.) Clarke; see *S. cochinchinensis* (Lour.) Moore ssp. *laurina* (Retz.) Nooteboom var. *laurina*

S. spicata Roxb. var. *malasica* Clarke; see *S. cochinchinensis* (Lour.) Moore ssp. *laurina* (Retz.) Nooteboom var. *laurina*

SYNEDRELLA (Asteraceae)

S. nodiflora (L.) Gaertn. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 238).

Estradiol content of roots determined as 0.166 mg/100g (*Bangladesh J. Biol. Sci.* 1976, *5*, 45; *Chem. Abstr.* 1979, *90*, 3135 s).

SYZYGIUM (Myrtaceae)

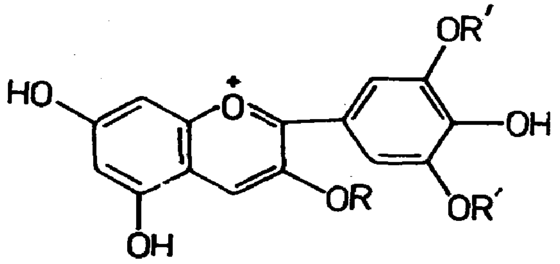
S. aromaticum (L.) Merr. & Perry syn. *Eugenia caryophyllata* Thunb., *E. caryophyllus* (Spreng.) Bullock & Harrison (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 238).

2-Hydroxy-4,6-dimethoxy-5-methylacetophenone, mp. 44°, isolated from clove oil (35.0%) (*Phytochemistry* 1972, *11*, 3311); caryophyllene, eugenol and naphthalene isolated on steam distillation of clove buds (*Phytochemistry* 1974, *13*, 1999).

S. cumini (L.) Skeels syn. *Eugenia jambolana* Lam. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 398).

Myricetin-3-L-arabinoside, dihydromyricetin and quercetin-3-D-galactoside isolated from flowers (*Curr. Sci.* 1972, *41*, 703); betulinic acid, friedelin, friedelinol, kaempferol and its 3-O-glucoside, quercetin, sitosterol and its glucoside and sucrose isolated from stem bark (*Curr. Sci.* 1974, *43*, 645); detection of heptacosane, nonacosane, triacontane, hentriacontane, octacosanol, triacosanol and dotriacosanol in leaves; betulinic acid and crotegolic (maslinic) acid isolated from leaves (*Phytochemistry* 1974, *13*, 2013); two new anthocyanins - delphinidin-3-gentiobioside and malvidin-3-laminaribioside - along with petunidin-3-gentiobioside isolated from fruits (*Indian J. Chem.* 1975, *13*, 20); gallic and ellagic acids, corilagin and related ellagitannins, 3,6-hexahydroxydiphenoylglucose and its isomer 4,6-hexahydroxydiphenoyl-glucose, 1-galloylglucose, 3-galloylglucose and quercetin found in seeds (*Planta Med.* 1975, *28*, 346); presence of 3,3',4'-tri-O-methylellagic, 3,4'-di-O-methylellagic, caffeic, ferulic, gallic and ellagic acids and guaiacol, resorcinol dimethyl ether and veratrole in seeds by TLC (*J. Inst. Chemists*, Calcutta 1975, *47*, 127; *Chem. Abstr.* 1976, *84*, 2249 w).

NEW COMPOUNDS



Delphinidin-3-gentiobioside
R = Gentiobiose, R' = H
Malvidine-3-laminaribioside
R = Laminaribiose, R' = Me

S. formosum (Wall.) Masamune syn. *Eugenia formosa* Wall.

B. - Phul jamb; Nep. - Bara jaman, Ambake; Assam - Laha jam.

Betulinic acid and erythrodiol isolated from seeds (*J. Indian Chem. Soc.* 1970, *47*, 181).
Distribution : Sub-Himalayan tracts, Nepal eastwards ascending to 500 m.

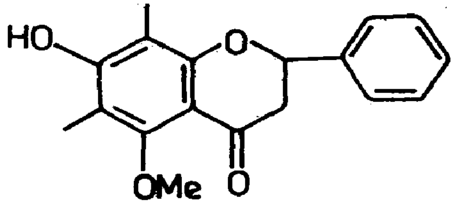
S. jambos (L.) Alston. syn. *Eugenia jambos* L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 398).

Ocimene, α-pinene, (+)camphene, (-)limonene, cadinene, (+)borneol and α-terpineol isolated from essential oil (*Perfum. Essent. Oil Rec.* 1969, *60*, 282; *Chem. Abstr.* 1970, *72*, 24494 b).

S. samarangense (Bl.) Merr. & Perry syn. *Eugenia javanica* Lamk. p.p. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 399).

5-O-Methyl-4′-desmethoxymatteucinol isolated from flowers and characterised (*Lloydia* 1973, *36*, 422).

NEW COMPOUNDS



5-O-Methyl-4′-desmethoxymatteucinol

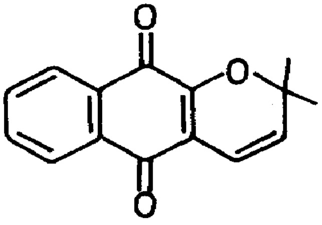
TABEBUIA (Bignoniaceae)

T. rosea DC.

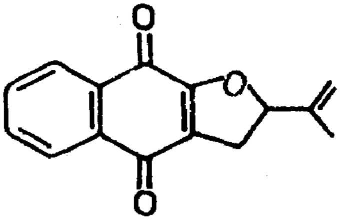
Dehydro-α-lapachone and dehydroiso-α-lapachone isolated from heartwood and roots (*Z. Naturforsch.* 1973, *28C*, 646; *Chem. Abstr.* 1974, *80*, 70651 p; *Planta Med.* 1977, *31*, 257); lapachol, dehydrotectol and β-sitosterol isolated from roots (*Planta Med.* 1977, *31*, 257).

Distribution : Native of tropical America, introduced into Indian gardens.

NEW COMPOUNDS



Dehydro-α-lapachone



Dehydroiso-α-lapachone

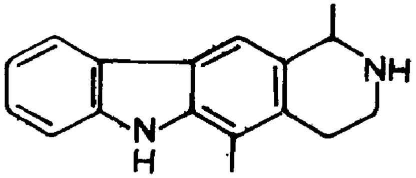
TABERNAEMONTANA (Apocynaceae)

T. coronaria R. Br.; see *T. divaricata* (L.) R. Br. ex R. & S.

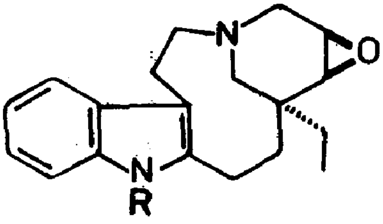
T. divaricata (L.) R. Br. ex R. & S.; syn. *T. coronaria* R. Br., *Ervatamia coronaria* Stapf, *E. divaricata* (L.) Alston (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 399).

Two new alkaloids - 19-(2-ketopropyl)coronaridine and 19-oxocoronaridine - isolated (*Atti Accad. Naz. Lincei, Cl. Sci. Fis. Mat. Natur. Rend.* 1972, *52*, 375; *Chem. Abstr.* 1973, *78*, 40468 a); leaves contained coronaridine, voacristine, tabernaemontanine and dregamine; α-amyrin, lupeol and their acetates and β-sitosterol also obtained (*Indian J. Pharm.* 1972, *34*, 163; *Phytochemistry* 1975, *14*, 1652); absolute configuration of coronaridine (*J. Am. Chem. Soc.* 1973, *95*, 5407); chiroptical studies on coronaridine and voacangine (*Collect. Czech. Chem. Commun.* 1974, *39*, 2258); voacangine and voaphylline also isolated from leaves (*Phytochemistry* 1974, *13*, 1621); coronaridine, voacangine, ibogamine and isovoacangine isolated from stem bark (*Rev. Cubana Farm.* 1976, *10*, 31; *Chem. Abstr.* 1977, *86*, 185878 j); voaphylline, hecubine and janetine isolated and their structures assigned (*Rev. Cubana Farm.* 1976, *10*, 45; *Chem. Abstr.* 1977, *87*, 2343 j; *Rev. Cubana Farm.* 1978, *12*, 177; *Chem. Abstr.* 1979, *90*, 138069 u).

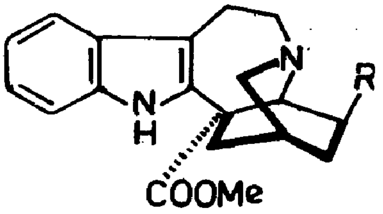
NEW COMPOUNDS



Janetine



Voaphylline
R = H
Hecubine
R = Me



19-(2-Ketopropyl)coronaridine
R = $CHMeCH_2COMe$
19-Oxocoronaridine
R = COMe

T. heyneana Wall.; see *Ervatamia heyneana* (Wall.) T. Cooke

T. sphaerocarpa Blume; see *Ervatamia sphaerocarpa* (Blume) Burke

T. wallichiana Steud.; see *Ervatamia wallichiana* (Steud.) Mehrotra & Rastogi Comb. nov.

TAGETES (Asteraceae)

T. erecta L. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 239).

Mono and diesterified luteins isolated from petals (*Rev. Esp. Fisiol.* 1978, *34*, 253; *Chem. Abstr.* 1978, *89*, 211941 h).

T. minuta L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 400).

Whole flowering plant was significantly active against Lewis lung carcinoma *in vivo* (*J. Pharm. Sci.* 1973, *62*, 1009).

Quercetagetrin and patuletrin isolated in addition to monomethyl fumarate and syringic acid (*J. Pharm. Sci.* 1973, *62*, 1009); detection of (+)limonene (8.5), ocimene (15.0), β-myrcene (20.0), aromadendrene (18.0), (-)linalool (2.5), linalyl acetate (2.5), linalool monoxide (5.0), (+)carvone (6.5), 1,8-cineole (2.5) and salicylaldehyde (2.5%) by GLC in essential oil of leaves (*Indian Perfum.* Pt. 1, 1975, *19*, 29; *Chem. Abstr.* 1977, *87*, 90579 u); (5E)ocimenone isolated from flowers and leaves (*Lloydia* 1978, *41*, 181).

BIOLOGICAL ACTIVITY

(5E)Ocimenone at 40 ppm caused 100% mortality of *Aedes aegypti* larvae in 24 hr (*Lloydia* 1978, *41*, 181).

TALAUMA (Magnoliaceae)

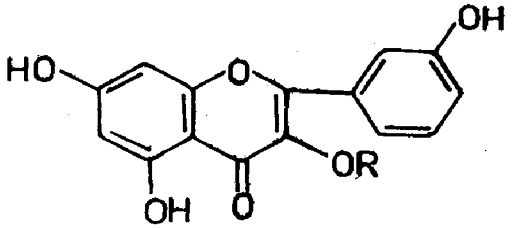
T. hodgsonii Hook.f. & Thoms.; see *Magnolia hodgsonii* (Hook.f. & Thoms.) Keng

TAMARIX (Tamaricaceae)

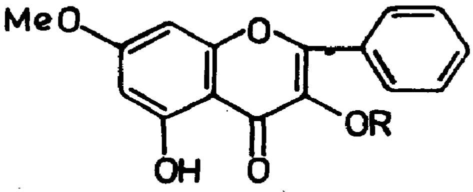
T. aphylla Karst. syn. *T. articulata* Vahl (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 239).

Two new glycosides - rhamnocitrin-3-glucoside and rhamnocitrin-3-rhamnoside - isolated and characterised; isolation of rhamnetin, rhamnocitrin, kaempferol-4′,7-dimethylether and quercetin (*Experientia* 1975, *31*, 1118); kaempferol-7,4′-dimethylether-3-sulphate and quercetin-3-O-isoferulyl-β-glucuronide isolated from flowers (*Phytochemistry* 1976, *15*, 231).

NEW COMPOUNDS



Quercetin-3-O-isoferulyl-glucuronide
R = Gluc. acid (isoferulyl)



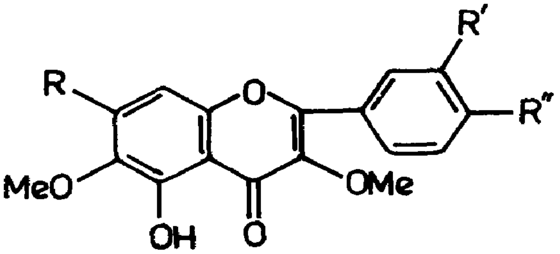
Rhamnocitrin-3-glucoside
R = Glu
Rhamnocitrin-3-rhamnoside
R = Rha

T. articulata Vahl; see *T. aphylla* Karst.

TANACETUM (Asteraceae)

T. fruticulosum Ledeb. syn. *Ajania fructiculosa* (Ledeb.) P. Polijakov (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 239).

5,3′,4′-Trihydroxy-3,6,7-trimethoxyflavone, mp. 236°, axillarin (5,7,3′,4′-tetrahydroxy-3,6-dimethoxyflavone), mp. 206°, and artemiselin (5-hydroxy-3,6,7,3′,4′-pentamethoxyflavone) mp. 160°, isolated (*Khim. Prir. Soedin.* 1977, *13*, 575; *Chem. Abstr.* 1977, *87*, 164244 e).
NEW COMPOUNDS



Axillarin
R,R′,R″ = OH
Artemiselin
R,R′,R″ = OMe

TARAXACUM (Asteraceae)

T. officinale Weber ex Wigg. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 401).

Neoxanthin isolated from petals (*Phytochemistry* 1972, *11*, 3383); isolation and identification of flavoxanthin and chrysanthemaxanthin (*Helv. Chim. Acta* 1978, *61*, 783); main fatty acids in seed oil were C_{16} (saturated), $C_{18:1}$ and $C_{18:2}$ (unsaturated); β-sitosterol (63.7%) present in nonsaponifiable matter (*Tokyo Gakugei Daigaku Kiyo, Dai-4-Bu* 1978, *30*, 91; *Chem. Abstr.* 1979, *90*, 200315 b).

TAXODIUM (Taxodiaceae)

T. mucronatum Tenore

Eng. - Montezuma cypress, Mexican marsh-cypress.

Hinokiflavone, isocryptomerin, cryptomerin A and cryptomerin B isolated (*J. Indian Chem. Soc.* 1976, *53*, 1165).

Distribution : Native of south-eastern USA and Mexico, introduced into India in Nilgiris, Kerala and Dehradun.

TAXUS (Taxaceae)

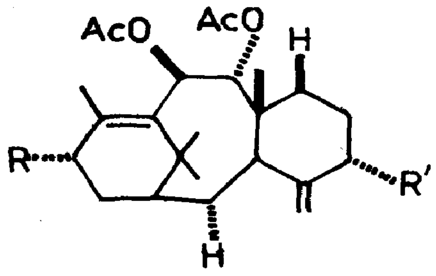
T. baccata L.; see *T. wallichiana* Zucc.

T. wallichiana Zucc. syn. *T. baccata* auct. (non L.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1900, p. 402).

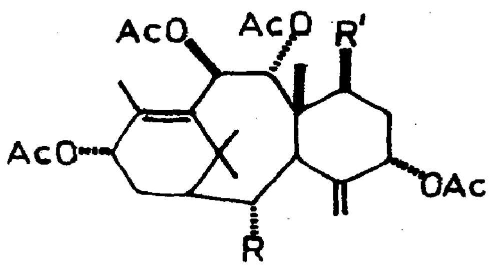
Fractions of extract of leaves inhibited pregnancy in 60% female rats (*Indian J. Med. Res.* 1972, *60*, 159).

Seven new taxane derivatives - taxa-4(20), 11-diene-5α,9α,10β,13α-tetraol tetraacetate (I), taxa-4-(20),11-diene-5α,9α,10β,13α-tetraol-9α,10β-diacetate (II),taxa-4(20),11-diene-2α,5α, 9α,10β,13α-pentaol pentaacetate (III), taxa-4(20), 11-diene-5α,7β,9α,10β,13α-pentaol pentaacetate (IV), taxa-4(20),11-diene-2α,5α,9α,10β,13α-hexaol hexaacetate (V), taxa-4(20),11-diene-2α,5α,7β,10β-tetraol-5α,7β,10β-triacetate, 2α-methyl butyrate (VI), and taxa-4 (20),11-diene-2α,5α,7β,9α,10β-pentaol 7β,9α,10β-triacetate-2α-methyl butyrate (VII) - isolated (*Chem. Commun.* 1969, 1282); taxine isolated (*Khim. Prir. Soedin.* 1970, *6*, 777; *Chem. Abstr.* 1971, *74*, 95411 z); a new lignan - taxiresinol - isolated from heartwood in addition to isotaxiresinol and secoisoariciresinol (*Indian J. Chem.* 1972, *10*, 677); betuloside, sciadopitysin, ginkgetin and sequoiaflavone isolated from leaves (*Planta Med.* 1976, *30*, 82); 4-p-coumaroyl-myo-inositol isolated from needles (*Plant Physiol.* 1977, *59*, 279; *Chem. Abstr.* 1977, *86*, 136344 y); shikimic and quinic acids isolated from needles (*Phytochemistry* 1978, *18*, 137).

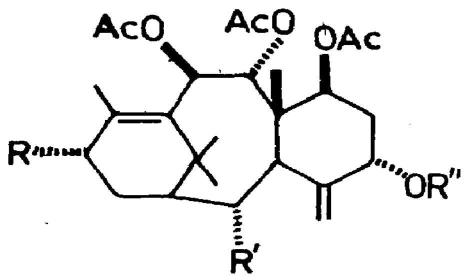
NEW COMPOUNDS



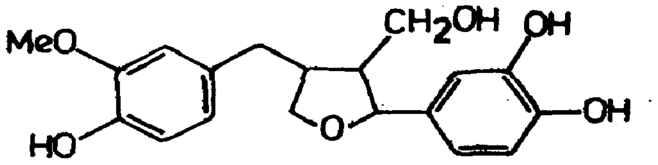
I
R,R' = OAc
II
R,R' = OH



III
R = OAc, R' = H
IV
R = H, R' = OAc



V
R,R' = OAc, R'' = Ac
VI
R = H, R' = O-α-methylbutyryl, R'' = Ac
VII
R = H,R' = O-α-methylbutyryl, R'' = H



Taxiresinol

TECOMA (Bignoniaceae)

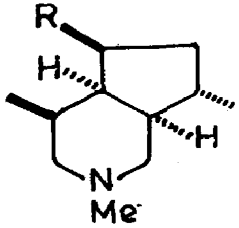
T. capensis Lindl. syn. *Tecomaria capensis* (Thunb.) Spach
Eng.- Cape honeysuckle.

An amorphous iridoid glycoside and trans-p-methoxycinnamic acid isolated from leaves (*Pharmazie* 1971, *26*, 640; *Chem. Abstr.* 1972, *76*, 43986 n).

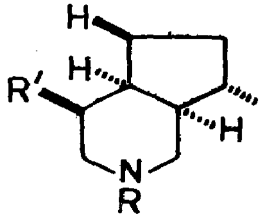
Distribution : Native of South Africa, introduced into Indian gardens as ornamental.

T. stans (L.) Juss. ex H. B. & K. syn. *Stenolobium stans* (L.) D. Don (*Compend. Indian Med. Plants*, Vol. I, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 403).

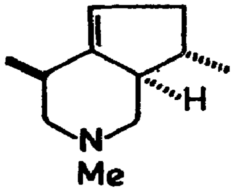
Two new alkaloids - 5-dehydroskytanthine and δ-skytanthine isolated (*Phytochemistry* 1973, *12*, 201; *Pharmazie* 1977, *32*, 41; *Chem. Abstr.* 1977, *86*, 140313 e); 5-hydroxyskytanthine, N-normethylskytanthine, tecostanine, tecomanine and boschniakine isolated and characterised (*Pharmazie* 1977, *32*, 41; *Chem. Abstr.* 1977, *86*, 140313 e).
NEW COMPOUNDS



δ-Skytanthine
R = H
5-Hydroxyskytanthine
R = OH



N-Normethylskytanthine
R = H, R' = Me
Tecostanine
R = Me, R ' = CH_2OH



5-Dehydroxyskytanthine

T. undulata (Roxb.) G. Don; see *Tecomella undulata* (Sm.) Seem.

TECOMARIA (Bignoniaceae)

T. capensis (Thunb.) Spach; see *Tecoma capensis* Lindl.

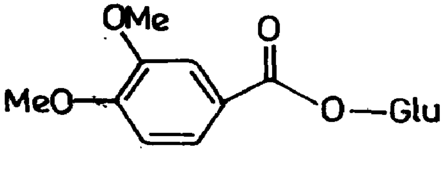
TECOMELLA (Bignoniaceae)

T. undulata (Sm.) Seem syn. *Tecoma undulata* (Roxb.) G. Don (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 403).

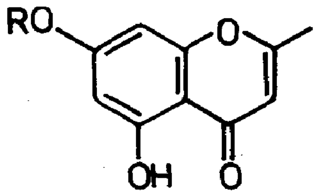
Aqueous extract showed nonspecific spasmolytic action against spasms induced by different spasmogens in guinea pig ileum and rat uterus preparations; it also produced moderate relaxation of dog intestine with no significant effect on blood pressure or respiration (*J. Res. Indian Med.* 1971, *6*, 226).

A new glucoside - tecomin, mp. 218^{o} - isolated from bark and its structure determined (*Experientia* 1970, *26*, 1187; *J. Indian Chem. Soc.* 1971, *48*, 937; *Indian J. Chem.* 1979, *17B*, 40); lapachol, veratric acid, dehydrotectol, ξ-sitosterol, a wax alcohol ferulate, n-tri contanol and tecomelloside isolated from heartwood and bark (*Phytochemistry* 1972, *11*, 1498; *ibid.* 1974, *13*, 663; *J. Indian Chem. Soc.* 1973, *50*, 561; *Curr. Sci.* 1977, *46*, 145; *Planta Med.* 1977, *31*, 14; *Indian J. Chem.* 1979, *17B*, 40); rutin, quercetin, luteolin-7-glucoside and β-sitosterol isolated from flowers (*Indian J. Chem.* 1975, *13*, 427); a new iridoid glucoside - 6-O-veratrylcatalposide - isolated (*Phytochemistry* 1975, *14*, 1441; *Planta Med.* 1977, *31*, 14); tectol and dehydro-α-lapachone isolated from roots (*Planta Med.* 1977, *31*, 14); n-alkanes, n-octacosanol, stigmasterol, campesterol, α-amyrin and oleanolic acid isolated from leaves (*Trans. Ill. State Acad. Sci.* 1977, *70*, 380; *Chem. Abstr.* 1979, *90*, 36335 k); a new chromone glucoside - undulatoside A - isolated and characterised as 7-(β-D-glucopyranosyloxy)-5-hydroxy-2-methylchromone (*Phytochemistry* 1979, *18*, 181); another new chromone glycoside - undulatoside B - isolated from bark along with β-sitosterol glucoside (*Indian J. Chem.* 1979, *17B*, 40).

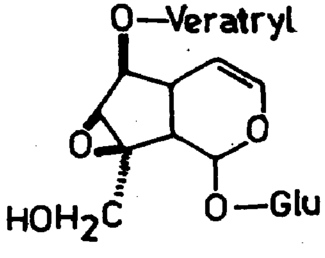
NEW COMPOUNDS



Tecomin



Undulatoside A
R = Glu
Undulatoside B
R = Glu(6→1)Xyl



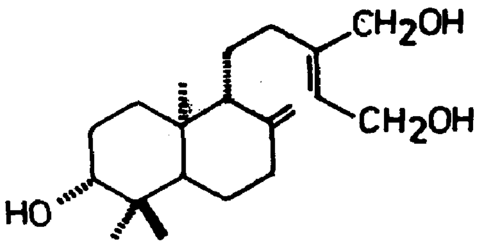
6-O-Veratrylcatalposide

TECTONA (Verbenaceae)

T. grandis L.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 404).

Lapachol, tectol, dehydrotectol, tectoquinone, β-lapachone, dehydro-α-lapachone and β-sitosterol isolated from roots (*Planta Med.* 1977, *32*, 50); a new diterpene - tectograndinol - isolated and its structure determined (*Z. Naturforsch*. 1977, *32C*, 724; *Chem. Abstr.* 1978, *88*, 3074 e).

NEW COMPOUNDS



Tectograndinol

TELOSMA (Asclepiadaceae)

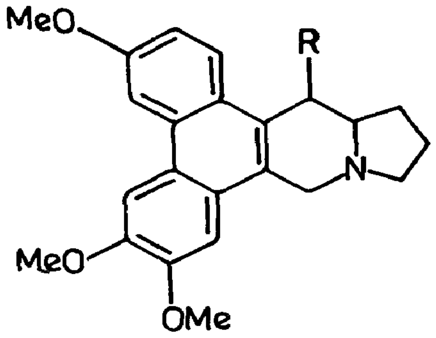
T. pallida (Roxb.) Craib syn. *Pergularia pallida* W. & A.

Kumaon - Surkila.

Five phenanthroindolizidine alkaloids - tylophorine, tylophorinidine, pergularinine, desoxypergularinine and an unidentified base - isolated from roots (*Phytochemistry* 1976, *15*, 1561).

Distribution : Throughout India upto 1500 m.

NEW COMPOUNDS



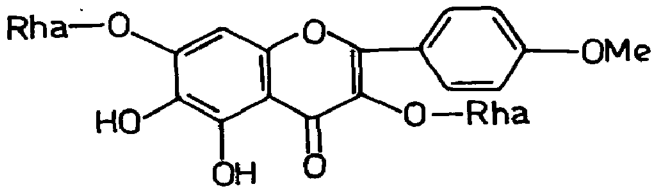
Deoxypergularinine
R = H
Pergularinine
R = OH

TEPHROSIA (Papilionaceae)

T. candida (Roxb.) DC. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 240).

A new flavanol glycoside - kaempferol-6-hydroxy-4'-methoxy-3,7-dirhamnoside (I) - isolated (*Phytochemistry* 1976, *15*, 232); obovatin methyl ether isolated from plant and characterised as 5-methoxy-2'',2''-dimethylpyrano(5'',6'')-flavone (*Chung-Kuo Nung Yeh Hua Hsueh Chih* 1979, *17*, 67; *Chem. Abstr.* 1979, *91*, 171631 q).

NEW COMPOUNDS



I

T. falciformis Ramaswami

H. - Rati biyani.

Elliptone, deguelin, rotenone and tephrosin isolated from roots (*Planta Med.* 1978, *33*, 418).

Distribution : North-west Rajasthan.

T. purpurea auct. [non (L.) Pers.]; see *T. wallichii* Grah. ex Fawc. & Rendle

T. purpurea (L.) Pers. (*Glossary (Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 241).

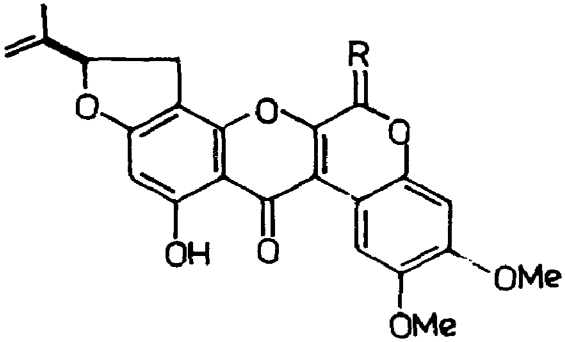
Caffeic acid isolated from dormant seeds (*Indian J. Exp. Biol.* 1977, *15*, 1072); rutin,

β-sitosterol and lupeol isolated from leaves (*Trans. Bose Res. Inst.* Calcutta, 1972, *35*, 1; *Chem. Abstr.* 1973, *79*, 123706 y; *Indian J. Chem.* 1977, *15*B, 971); delphinidin chloride and cyanidin chloride isolated from flowers (*Sci. Cult.* 1978, *44*, 322).

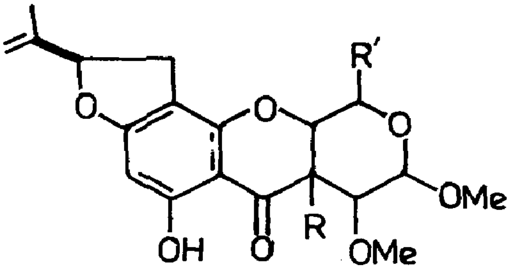
T. villosa (L.) Pers. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 241).

Two new rc'enoids - villosol and villosinol - isolated from pods and characterised as 6a,12a-dehydrosumatrol and 12a-hydroxysumatrol respectively (*Indian J. Chem.* 1976, *14*B, 152); isolation and structure elucidation of new rotenoids - villosin, villol, villinol and villosone (*Tetrahedron Lett.* 1977, 2125).

NEW COMPOUNDS



Villosol
R = H,H
Villinol
R = H,OMe
Villosone
R = O



Villosinol
R = OH, R' = H
Villosin
R = H, R' = β-OH
Villol
R = OH, R' = β-OH

T. wallichii Grah. ex Fawc. & Rendle syn. *T. purpurea* sensu Baker, p.p. [non (L.) Pers.] H.. - Biyani.

Rutin isolat.. .om leaves (*Trans. Bose Res. Inst.* Calcutta, 1972, *35*, 1; *Chem. Abstr.* 1973, *79*, 123706 y).

Distribution : Rajasthan and perhaps elsewhere in dry places.

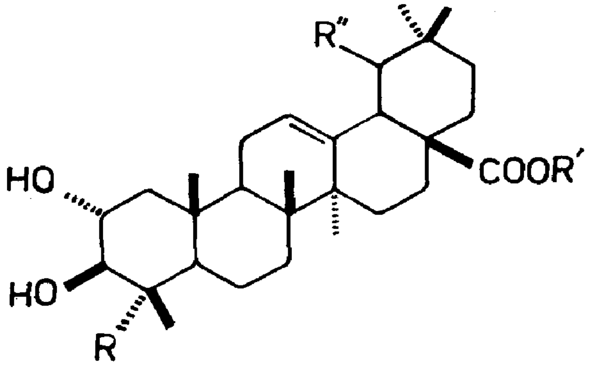
TERMINALIA (Combretaceae)

T. arjuna (Roxb.) W. & A. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 405).

A new trihydroxytriterpene acid - arjunic acid - isolated from bark along with β-sitosterol and ellagic acid (*Indian J. Chem.* 1970, *8*, 716); a glucoside - arjunetin - isolated from bark (*Indian J. Chem.* 1970, *8*, 722); a new sapogenin - arjungenin - isolated and characterised as 2α,3β,19α,23-tetrahydroxyolean-12-en-28-oic acid (*Chem. Pharm. Bull.* 1976, *24*, 178; *Bull. Chem. Soc. Jpn.* 1976, *49*, 3213); two new saponins - arjunglucoside I and arjunglucoside II -

isolated and characterised (*Bull. Chem. Soc. Jpn.* 1976, *49*, 3213).

NEW COMPOUNDS



Arjunic acid
R = Me, R' = H, R'' = α-OH
Arjunetin
R = Me, R' = Glu, R'' = α-OH
Arjungenin
R = CH_2OH; R' = H, R'' = α-OH
Arjunglucoside I
R = CH_2OH, R' = Glu, R'' = α-OH
Arjunglucoside II
R = CH_2OH, R' = Glu, R'' = H

T. bellirica (*belerica*) (Gaertn.) Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 406).

Fruit extract produced fall in blood pressure of rat at 70 mg/kg. It produced significant (P-0.02) increase of bile secretion at dose of 3 mg/kg in dogs (*J. Res. Indian Med.* 1975, *10*, 27).

β-Sitosterol, gallic acid, ellagic acid, ethyl gallate, galloyl glucose and chebulagic acid isolated from fruits (*Indian J. Chem.* 1970, *8*, 1047).

T. chebula (Gaertn.) Retz. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 406).

Palmitic, stearic, oleic, linoleic, arachidic and behenic acids isolated from fruit kernels (*J. Inst. Chemists,* Calcutta 1974, *46*, 189; *Chem. Abstr.* 1975, *83*, 120717 z).

T. procera Roxb.

β-Sitosterol, ellagic acid, 3,3'-di-O-methylellagic acid and 3,3',4-tri-O-methylellagic acid isolated (*Curr. Sci.* 1976, *45*, 864).

Distribution : Endemic to Andaman and Nicobar Islands.

TETRAGONIA (Tetragoniaceae)

T. tetragonioides (Pall.) O. Ktze.

Kan. - Chikesoppu.

Plant used in folk medicine for treatment of cancer; β-carotene and oxalic acid isolated (*Proc. Nat. Sci. Counc.* 1975, *8*, 145; *Chem. Abstr.* 1977, *86*, 60451 h).

Distribution : Introduced into India, cultivated in hills of north Bengal, Shillong and other hill stations, south India and plains of north India.

TETRAPANAX (Araliaceae)

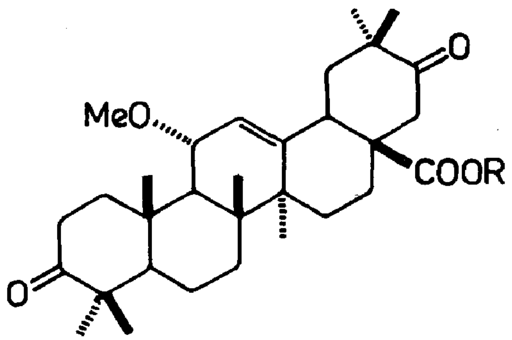
T. papyriferum (Hook.) K. Koch

Eng. - Chinese rice paper plant.

A new triterpenoid glycoside isolated from leaves and characterised as 11α-methoxy-3,21-dioxo-olean-12-en-28-oyl-L-rhamnopyranosyl-(1→4)-β-D-glucopyranosyl(1→6)-β-D-glucopyranoside (I) (*J. Chem. Soc.* Perkin 1 1977, 1801); isolation and crystal structure of papyriogenin G (*Chem. Commun.* 1978, 364).

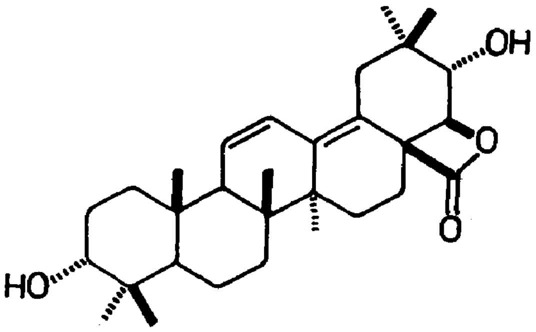
Distribution : Native to south China and Taiwan, introduced into gardens in India, particularly in Assam and Nilgiris.

NEW COMPOUNDS



I

R = Glu(6→1)Glu(4→1)Rha



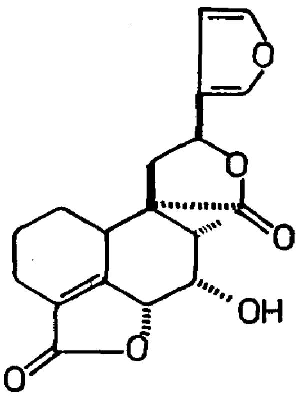
Papyriogenin G

TEUCRIUM (Lamiaceae)

T. chamaedrys L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956 , p. 242).

Structure elucidation of teucrin A, isolated from plant (*Khim. Prir. Soedin.* 1973, *9*, 31; *Chem. Abstr.* 1973, *78*, 148084 m).

NEW COMPOUNDS



Teucrin A

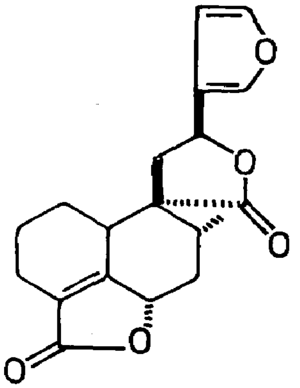
T. stoloniferum Roxb.; see *T. viscidum* Blume

T. viscidum Blume syn. *T. stoloniferum* Roxb.

Isolation and crystal structure of teucvin (*Chem. Commun.* 1973, 793; *J. Chem. Soc.* Perkin 1 1974, 1547).

Distribution : Bengal, Meghalaya and Sikkim, ascending to 1500 m.

NEW COMPOUNDS



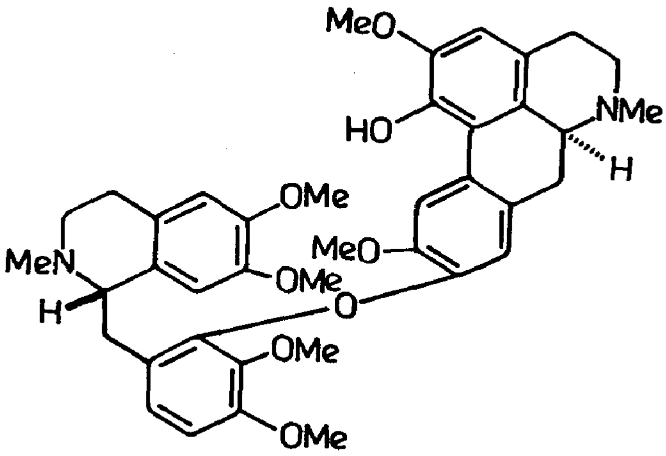
Teucvin

THALICTRUM (Ranunculaceae)

T. foetidum L. syn. *T. minus* L. var. *foetidum* (L.) Hook.f. & Thoms. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 408).

Rutin and rhamnetin-3β-D-glucopyranoside isolated (*Khim. Prir. Soedin.* 1969, 5, 369; *Chem. Abstr.* 1970, 72, 75650 g); (+)fetidine isolated and its structure elucidated (*Tetrahedron Lett.* 1972, 2309).

NEW COMPOUNDS



Fetidine

T. foliolosum DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 409).

BIOLOGICAL ACTIVITY

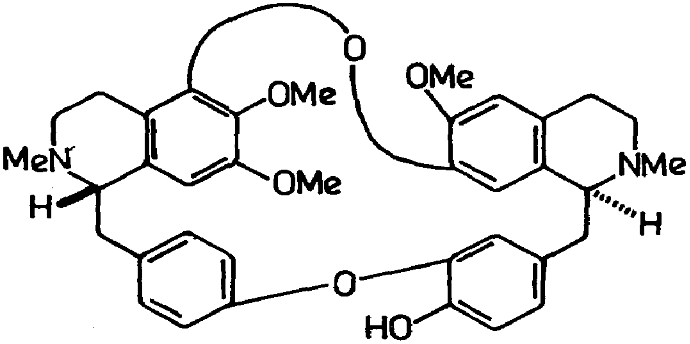
Thalictrine (30-150 mg/kg) showed weak inhibitory effects in lymphoma NK/LY, alveolar hepatoma Pc-1 and Pliss lymphosarcoma test systems in mice or rat (*Farmakol. Alkaloidov Ikh Proizvod* 1972, 171; *Chem. Abstr.* 1974, *80*, 103857 r).

T. minus L. var. *foetidum* (L.) Hook.f. & Thoms.; see *T. foetidum* L.

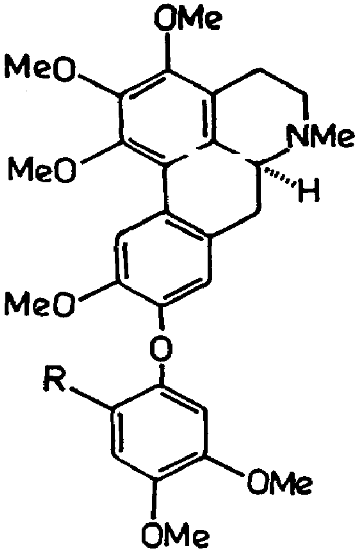
T. minus L. syn. *T. thunbergi* DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 409).

A new unsaturated acid - thalictric acid, mp. 39^{o} - isolated from oil and characterised as trans-5-octadecenoic acid (*Khim. Prir. Soedin.* 1969, *5*, 214; *Chem. Abstr.* 1970, *72*, 63615 m); vitexin, saponaretin, orientin, isoorientin, quercetin-3-rutinoside and kaempferol-3-rhamnoglucoside isolated from aerial parts (*Phytochemistry* 1971, *10*, 2553); structure of O-methylthalicberine confirmed by synthesis (*Chem. Pharm. Bull.* 1972, *20*, 368); synthesis of thalicarpine (Ger. 2,161,187 (1973), June 14; *Chem. Abstr.* 1973, *79*, 53659 j); thalictine isolated (*Chem. Pharm. Bull.* 1975, *23*, 2279); new aporphine benzylisoquinoline alkaloids - thaliadanine and thaliadine - isolated from roots along with adiantifoline (*Lloydia* 1978, *41*, 271); berberine and magnoflorine isolated as iodides from roots (*Quart. J. Crude Drug Res.* 1979, *17*, 81).

NEW COMPOUNDS

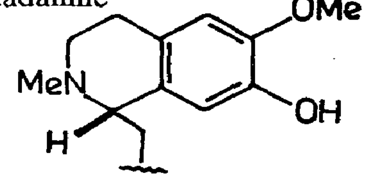


Thalictine



Thaliadine
R = CHO
Thaliadanine

R =



BIOLOGICAL ACTIVITY

Thalicmine HCl and thalicmidine HCl at 10-15 mg/kg, i.p., inhibited conditioned escape reflexes in rats and at 5-100 mg/kg caused salivation and lacrimation in cats along with loss of coordination, catalepsy and other nervous disturbances (*Farmakol. Alkaloidov Serdechnykh Glikozidov* 1971, 127; *Chem. Abstr.* 1973, *78*, 79630 x); thalicmidine HCl and thalicmine HCl inhibited orientation reaction in mice at 25-100 mg/kg, s.c. They also enhanced soporific and narcotic action of subsequently administered hexenal or chloral hydrate at the same dose (*Farmakol. Alkaloidov Serdechnykh Glikozidov* 1971, 137; *Chem. Abstr.* 1973, *78*, 79632 z); thalicmidine methiodide (0.5-1 mg/kg, i.v.) decreased blood pressure in anaesthetised dogs; it blocked transmission of nerve impulses through superior cervical ganglia of cats and large doses blocked neuromuscular transmission in frogs and rabbits (*Farmakol. Alkaloidov Serdechnykh Glikozidov* 1971, 141; *Chem. Abstr.* 1973, *78*, 79633 a); thalicmidine methiodide did not cause any structural changes in internal organs of rabbits when administered i.v. at 0.1-2.0 mg/kg/day for 10-30 days; it did not affect the Hb level or erythrocyte and leucocyte count in blood (*Farmakol. Alkaloidov Ikh Proizvod* 1972, 121; *Chem. Abstr.* 1974, *80*, 128151 u).

Thalmine at 250 mg/kg showed significant activity in mice and rats against ascites lymphoma NK/LY; thalsimine (60-150 mg/kg) and thalmidine (30-100 mg/kg) showed only weak inhibitory effects on growth of lymphoma NK/LY, alveolar hepatoma Pc-1 and Pliss lymphosar-

coma (*Farmakol. Alkaloidov Ikh Proizvod* 1972, 171; *Chem. Abstr.* 1974, *80*, 103857 r); thalmine, thalcimine, thalictrinine, fetidine and O-methylthalicberine were more effective against experimental inflammation in mouse paw than aminopyrine and sodium salicylate (*Farmakol. Alkaloidov Serdechnykh Glikozidov* 1971, *120*, 122; *Chem. Abstr.* 1973, *78*, 66916 v, 79555 b); thalicmine at 5-10 mg/kg, s.c., and thalicmidine less effectively, suppressed motor component of the orientation reaction in mice and inhibited central adrenoreactive systems; thalicmine exerted biphasic action on bioeletric activity of brain (*Med. Zh. Vzb.* 1973, *40*; *Chem. Abstr.* 1974, *81*, 33340 m).

Thalictrimine HCl administered to pregnant cats at 1-5 mg/kg, i.v., and to rabbits at 3-5 mg/kg increased tonus and contractility of uterus. Excitability of autonomic ganglia was also impaired, whereas blood pressure, blood circulation and cardiac contractions in cats remained relatively unchanged. Diuresis was increased by about 20% at 2-3 mg/kg, s.c. or i.v., in dogs (*Tr. Vses. Nauch.-Issled. Inst. Lek. Rast.* 1971, *14*, 91; *Chem. Abstr.* 1973, *79*, 142838 j); thalicminine at 0.25-3.0 mg/kg dose stimulated respiration and showed short-lasting hypotensive effect in dogs (*Farmakol. Alkaloidov Ikh Proizdov* 1972, 118; *Chem. Abstr.* 1974, *80*, 91212 m); thalicarpine (10 mg/kg, infused i.v.) decreased mean arterial pressure and force of contraction but increased carotid artery blood flow and heart rate in anaesthetised monkeys (*Pharmacology* 1973, *10*, 178; *Chem. Abstr.* 1974, *80*, 10460 r).

Thaliadanine, thaliadine and adiantifoline exhibited antihypertensive effect in rabbits. Thaliadanine had bactericidal activity against *Mycobacterium smegmatis* at 100 μg/ml (*Lloydia* 1978, *41*, 271).

T. thunbergi DC.; see *T. minus* L.

THEA (Theaceae)

T. sinensis L.; see *Camellia sinensis* (L.) Kuntze

THEOBROMA (Sterculiaceae)

T. cacao L. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 243).

Detection of tyramine by HPLC and TLC (*Phytochemistry* 1977, *16*, 1602).

THESPESIA (Malvaceae)

T. populnea (L.) Soland. ex Correa (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 413).

Populneol isolated and identified as monobenzyl ether of γ-resacetophenone (*Indian J. Chem.* 1971, *9*, 286); gossypol isolated from flowers; its methylation yielded three isomeric optically active hexamethyl ethers, which were characterised (*Indian J. Chem.* 1972, *10*, 263; *Curr. Sci.* 1973, *42*, 821); kaempferol, quercetin, rutin, kaempferol-3-rutinoside, kaempferol-3-glucoside, kaempferol-5-glucoside and quercetin-3-glucoside isolated from flowers (*Indian J. Chem.* 1973, *11*, 506; *Curr. Sci.* 1975, *44*, 888); calycopterin isolated from heartwood (*Curr.

Sci. 1975, *44*, 888).

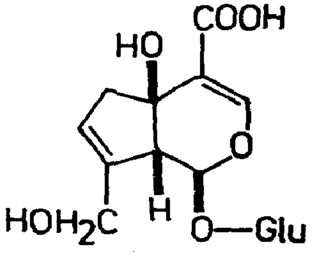
THEVETIA (Apocynaceae)

T. neriifolia Juss. ex Steud.; see *T. peruviana* (Pers.) K. Schum.

T. peruviana (Pers.) K. Schum. syn. *T. neriifolia* Juss. ex Steud.

L-(±)Bornesitol isolated from stems (0.03) and leaves (0.4%) (*Nagoya Shirtsu Daigaku Yakugakubu Kenkyu Nenpo* 1970, 79; *Chem. Abstr.* 1971, *75*, 126645 f; *Phytochemistry* 1971, *10*, 896); theveside and viridoside isolated from seeds (*Tetrahedron Lett.* 1970, 3195); thevefolin isolated from seeds identified as 14-hydroxy-3β-(α-L-thevetopyranosyl)-5α-card-20(22)-enolide (*C. R. Acad. Sci.* Ser. D., 1971, *272*, 2620; *Chem. Abstr.* 1971, *75*, 59762 b); apigenin-5-methyl ether isolated from seed shells (*Lloydia* 1973, *36*, 105); epiperuviol acetate, hesperitin-7-glucoside, α- and β-amyrin, kaempferol and quercetin isolated from fruit pericarp and flowers (*Indian J. Pharm.* 1975, *37*, 124).

NEW COMPOUNDS



Theveside

BIOLOGICAL ACTIVITY

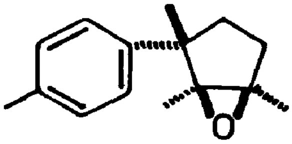
Cardioactive peruvoside evoked vomiting by stimulation of nodose ganglion. Its i.v. or p.o. administration produced emesis in dogs and cats (*Neuropharmacology* 1972, *11*, 427; *Chem. Abstr.* 1972, *77*, 70343 c); peruvoside 80 μg/kg, i.v. or 15 μg/kg/min doses in dogs and guinea pigs respectively showed bradycardia and configurational changes in electrocardiogram T wave; among the definite differences were nonoccurrence of sinus tachycardia following bradycardia and relatively late onset and short duration of ventricular tachycardia in guinea pig as compared to dog. Since sensitivity of dog to glycoside is known to be 3-4 times that of guinea pig, these differences are possibly due to the differences in species sensitivity (*Indian J. Exp. Biol.* 1973, *11*, 295).

THUJA (Cupressaceae)

T. orientalis L. syn. *Biota orientalis* Endl. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 415).

Synthesis of dehydro-α-curcumene (*Agric. Biol. Chem.* 1972, *36*, 503; *Chem. Abstr.* 1972, *77*, 48654 h); revised structure of curcumene ether (*Indian J. Chem.* 1974, *12*, 1202).

NEW COMPOUNDS



Curcumene ether

THUNBERGIA (Acanthaceae)

T. laurifolia Lindl.

Delphinidin-3,5-di-O-β-D-glucopyranoside, apigenin and its 7-β-D-glucopyranoside isolated from flowers (*J. Indian Chem. Soc.* 1978, *55*, 622).

Distribution : Andaman and Nicobar Islands.

THYMUS (Lamiaceae)

T. linearis Benth. syn. *T. serpyllum* auct. (non L.), *T. quinquecostatus* Celak (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 244).

α-Pinene, β-pinene, camphene, limonene, p-cymene, β-caryophyllene, humulene, β-bisabolene, bornyl acetate, camphor, carvacrol, thymol, linalool, borneol, cineole, camphene, geraniol, thymohydroquinone, γ-cadinene, terpinene-4-ol, 3-octanone and 1-octen-3-ol identified by GLC in essential oil (*Nippon Kagaku Kaishi* 1973, 775; *Chem. Abstr.* 1973, *79*, 103718 g).

T. quinquecostatus Celak; see *T. linearis* Benth.

T. serpyllum L.; see *T. linearis* Benth.

T. vulgaris L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 415).

Luteolin-7-β-D-glucoside, luteolin-7-β-D-diglucoside and apigenin-7-β-D-glucoside isolated (*Herba Pol.* 1975, *21*, 347; *Chem. Abstr.* 1976, *85*, 74939 q).

TILIACORA (Menispermaceae)

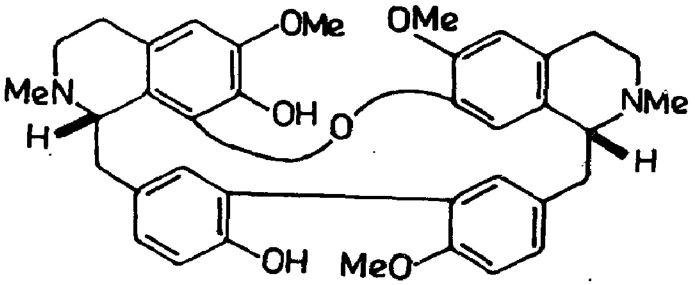
T. acuminata (Lamk.) Miers syn. *T. racemosa* Colebr. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 416).

Methiodide of total alkaloids from leaves (0.5 mg/kg, i.v.) administered to cats showed marked and prolonged vasodepressive property. This effect was not blocked by atropine, mepyramine or propranolol; effect of alkaloid methiodide on hind limb perfusion of frog suggested vasodepression may be due to direct dilating effect on musculature of blood vessels. It showed direct depressant action on rabbit ileum and rat uterus and its LD50 was 40 mg/kg (orally) in rats (*Indian J. Pharmacol.* 1976, *8*, 187).

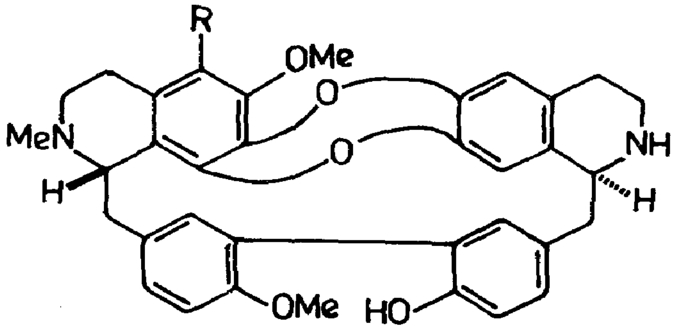
Structure elucidation of tiliamosine and nortiliacorinine A, isolated from root bark as

N-acetyl derivatives (*Tetrahedron Lett.* 1976, 4241); absolute configuration of tiliageine (*Tetrahedron* 1978, *34*, 1409); configuration of tiliacorine (*Chem. Commun.* 1978, 226).

NEW COMPOUNDS



Tiliageine



Tiliamosine
R = OMe
Nortiliacorinine A
R = H

T. racemosa Colebr.; see *T. acuminata* (Lamk.) Miers

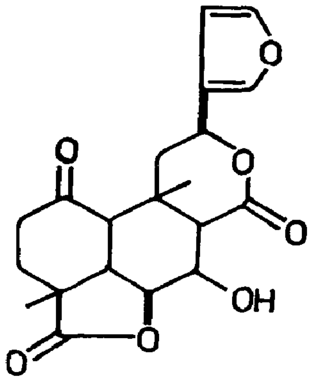
TINOSPORA (Menispermaceae)

T. cordifolia (Willd.) Miers ex Hook.f & Thoms. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 416).

Aqueous extract of stem showed anti-inflammatory, analgesic and antipyretic actions in rats and immunosuppressive effect in rabbits; 50 mg/100 g, orally and i.p., significantly inhibited acute inflammatory response evoked by carrageenin. It significantly inhibited antibody formation by typhoid "H" antigen. It also potentiated morphine analgesia (*Indian J. Pharmacol.* 1977, *9*, 221).

Tinosporidine and β-sitosterol isolated from stems; cordifol, heptacosanol and octacosanol from leaves (*Sci. Res.* 1970, 7, 61; *Chem. Abstr.* 1972, *77*, 137377 n; *Indian J. Appl. Chem.* 1971, *34*, 46; *Chem. Abstr.* 1974, *80*, 24816 y); a new furanoid diterpene - tinosporide - isolated from stems and its structure determined (*Indian J. Chem.* 1978, *16*B, 317).

NEW COMPOUNDS



Tinosporide

TITHONIA (Asteraceae)

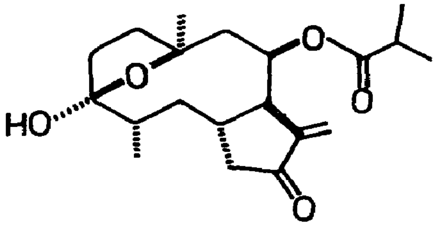
T. diversifolia A. Gray

Eng. - Mexican sunflower.

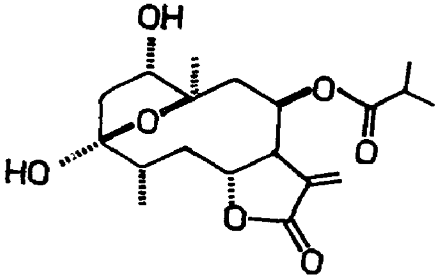
Isolation and structure elucidation of tirotundin (*Rev. Latinoam. Quim*. 1978, *9*, 202; *Chem. Abstr.* 1979, *91*, 20753 e; *J. Org. Chem.* 1979, *44*, 1831); isolation of tagitinins A,C and E and confirmation of their stereostructures (*J. Org. Chem.* 1979, *44*, 1831).

Distribution : Native of Mexico, grown in Indian gardens and naturalised in sub-Himalayan tracts near Dehradun.

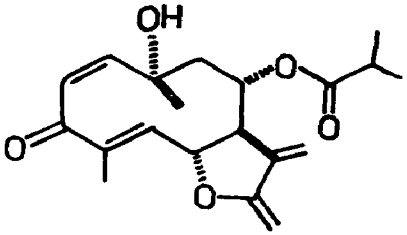
NEW COMPOUNDS



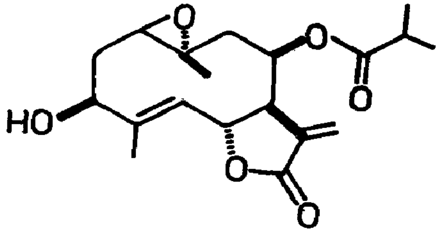
Tirotundin



Tagitinin A



Tagitinin C



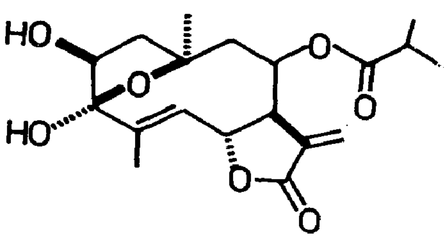
Tagitinin E

T. tagitiflora Desf. ex Juss.

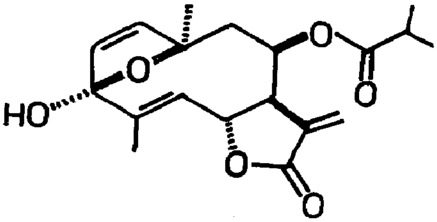
Six new germacranolides - tagitinins A,B,C,D,E and F - *β*-sitosterol and its glucoside isolated (*J. Pharm. Sci.* 1976, *65*, 918); structure determination of tagitinin A (*Indian J. Chem.* 1976, *14*B, 259); structure of tagitinin B elucidated (*Indian J. Chem.* 1976, *14*B, 77); structures of tagitinins C,D and F; tagitinin D presumably identified with tirotundin (*Indian J. Chem.* 1977, *15*B, 208); structure of tagitinin E (*Indian J. Chem.* 1977, *15*B, 533).

Distribution : Introduced into Indian gardens, runs wild in Khandala in Western Ghats and elsewhere.

NEW COMPOUNDS



Tagitinin B



Tagitinin F

BIOLOGICAL ACTIVITY

Tagitinin F showed significant antileukaemic activity in lymphocytic leukaemia (P-388) system in mice (*J. Pharm. Sci.* 1976, *65*, 918).

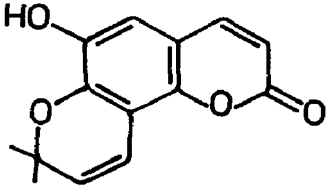
TODDALIA (Rutaceae)

T. aculeata Pers.; see *T. asiatica* (L.) Lam.

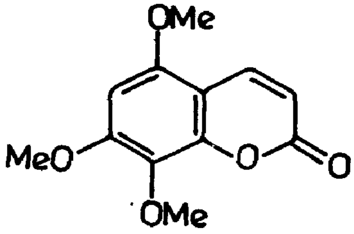
T. asiatica (L.) Lam. syn.*T. aculeata* Pers. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 417).

Two new coumarins - norbraylin and 5,7,8-trimethoxycoumarin - isolated (*Phytochemistry* 1976, *15*, 1419).

NEW COMPOUNDS



Norbraylin



5,7,8-Trimethoxycoumarin

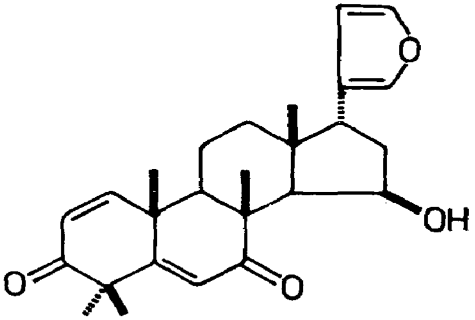
TOONA (Meliaceae)

T. ciliata M. Roem. syn. *Cedrela toona* Roxb. ex Rottl. & Willd. (*Compend. Indian Med.*

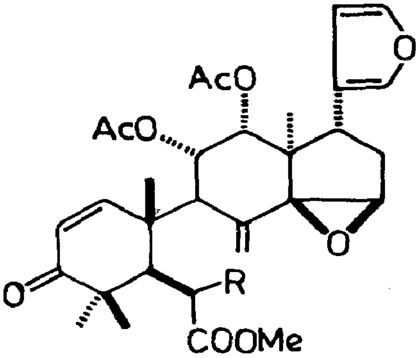
Plants, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, 418).

Cedrelone, 1,2-dihydrocedrelone, bergapten and β-sitosterol isolated (*Phytochemistry* 1971, *10*, 2533; *Planta Med.* 1975, *28*, 52); a new tetranortriterpenoid - 6-deoxycedrelone - isolated (*Planta Med.* 1975, *28*, 52); a coumarin - siderin - isolated from wood (*Phytochemistry* 1975, *14*, 1673); two new B-secotetranortriterpenoids - toonacilin and 6-acetoxytoonacilin - isolated from bark and their structures elucidated (*Angew. Chem.* 1978, *90*, 476; *Chem. Abstr.* 1978, *89*, 39402 v).

NEW COMPOUNDS



6-Deoxycedrelone



Toonacilin
R = H
6-Acetoxytoonacilin
R = OAc

BIOLOGICAL ACTIVITY

Toonacilin and 6-acetoxytoonacilin showed antifeeding activity against *Epilachna varivestis* (*Angew. Chem.* 1978, *90*, 476; *Chem. Abstr.* 1978, *89*, 39402 v)..

TRACHELOSPERMUM (Apocynaceae)

T. fragrans (Wall.) Hook.f.; see *T. lucidum* (D. Don) K. Schum.

T. lucidum (D. Don) K. Schum. syn. *T. fragrans* (Wall.) Hook.f. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 245).

β-Amyrin, β-sitosterol, its glucoside, ursolic acid, quercetin, hyperin, quercitrin and astilbin isolated from leaves (*Planta Med.* 1977, *32*, 46).

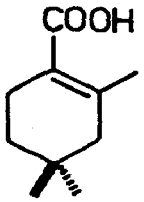
TRACHYSPERMUM (Apiaceae)

T. roxburghianum (DC.) Wolff syn. *Carum roxburghianum* Benth. & Hook.f. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 245).

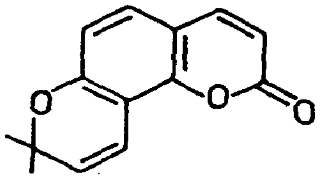
Bergapten isolated from fruits (*Indian J. Pharm.* 1973, *35*, 127); α- and β-pinenes, sabinene, terpinene, α- and β-phellandrene, linalool, α-terpineol, thymol and carvacrol present in essential oil (*Planta Med.* 1976, *30*, 337); detection of α-pinene, myrcene, car-3-ene, limonene, γ-terpinene, p-cymene, (-)cadinene, fenchone, thymol, linalool, piperitone, seselin,

α-terpineol, bergapten and isopimpinellin by GLC in essential oil of seeds (*Pakistan J. Sci. Ind. Res.* 1977, *20*, 48; *Chem. Abstr.* 1979, *90*, 121812 h); revised structures of β-cyclolavandulic acid and seselin (*Phytochemistry* 1978, *17*, 559).

NEW COMPOUNDS



β-Cyclolavandulic acid



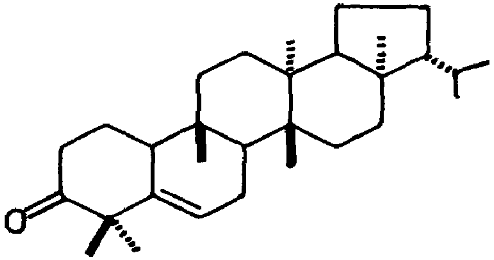
Seselin

TREMA (Ulmaceae)

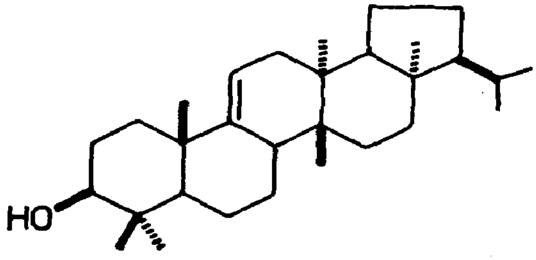
T. orientalis (L.) Blume syn. *Celtis orientalis* L. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 246).

Octacosanoic acid and 1-octacosanyl acetate isolated (*Phytochemistry* 1972, *11*, 2361); simiarenone, simiarenol and episimiarenol isolated from stem bark (*Phytochemistry* 1973, *12*, 732); a new triterpene alcohol - trematol - isolated from stem bark and its structure determined (*Phytochemistry* 1977, *16*, 1606).

NEW COMPOUNDS



Simiarenone



Trematol

TRIANTHEMA (Ficoidaceae)

T. monogyna L. syn. *T. portulacastrum* L. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 246).

Ecdysterone isolated (*Phytochemistry* 1971, *10*, 2225).

T. portulacastrum L.; see *T. monogyna* L.

TRIBULUS (Zygophyllaceae)

T. alatus Delile; see *T. longipetalus* Viv. ssp. *longipetalus*

T. longipetalus Viv. ssp. *longipetalus* syn. *T. alatus* Delile (*Glossary Indian Med. Plants,*

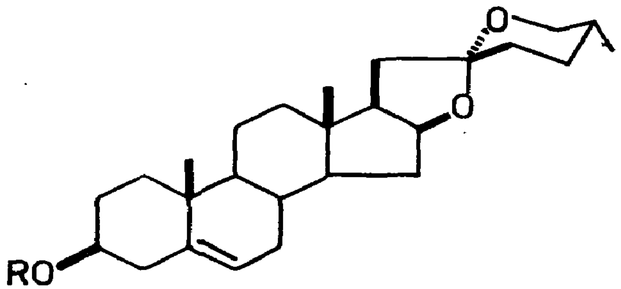
Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 246).

Stigmasterol, campesterol, β-sitosterol, luteolin, kaempferol- 3-glucoside, rutin, diosgenin, gitogenin, chlorogenin, glucose and rhamnose isolated from fruits (*Chem. Era* 1977, *13*, 261; *Chem. Abstr.* 1978, *89*, 3174 h).

T. terrestris L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 420).

Diosgenin, ruscogenin and a dihydroxy spirosteroidal sapogenin isolated from aerial parts (*Khim. Prir. Soedin.* 1970, *6*, 488; *Chem. Abstr.* 1971, *74*, 1054 k); five diosgenin glycosides isolated; one contained glucose, arabinose and rhamnose, two contained glucose and rhamnose and remaining two contained only glucose (*Khim. Prir. Soedin.* 1972, *8*, 475; *Chem. Abstr.* 1973, *78*, 1988 a); campesterol, β-sitosterol, stigmasterol, diosgenin and neotigogenin isolated from roots (*Dokl. Bolg. Akad. Nauk* 1973, *26*, 379; *Chem. Abstr.* 1973, *79*, 102746 w; *J. Inst. Chemists*, Calcutta 1978, *50*, 49; *Chem. Abstr.* 1978, *89*, 56460 e); a new saponin - terrestroside F - along with saponins C and G isolated from aerial parts; saponins C and G proved to be mixture of two tigogenin and diosgenin glycosides each containing glucose and rhamnose; astragalin also isolated; partial structure of purified saponin C proposed (*Planta Med.* 1974, *25*, 231; *ibid.* 1978, *34*, 188); trillin, gracillin and dioscin isolated (*Khim. Prir. Soedin.* 1975, *11*, 260; *Chem. Abstr.* 1975, *83*, 128650 t); hecogenin isolated (*Planta Med.* 1977, *32*, 223); structure elucidation studies on tribuloside (*Planta Med.* 1978, *34*, 93).

NEW COMPOUNDS



Trillin
R = Glu
Gracillin
R = Glu→Glu→Rha
Dioscin
R = Glu(4→1)Man(6-deoxy)(2→1)Man(6-deoxy)

TRICHODESMA (Cucurbitaceae)

T. zeylanicum (Burm.f.) R. Br. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 247).

Oleic (30.6), linoleic (21.9), octadeca-9,12,15-trienoic (21.6), octadeca-6,9,12-trienoic (5.5)

and octadeca-6,9,12,15-tetraenoic (3.5%) acids found in seed fat (*J. Oil Technol. Assoc.* India 1973, *5*, 8; *Chem. Abstr.* 1973, *78*, 156602 u).

TRICHOLEPIS (Asteraceae)

T. glaberrima DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1990, p. 247).

Plant lipid fraction contained C_{27}-C_{33} n-alkanes, C_{28}-C_{32} n-alkanols and a mixture of sitosterol, stigmasterol and campesterol (*Trans. Ill. State Acad. Sci.* 1976, *69*, 310; *Chem. Abstr.* 1977, *87*, 197348 v); betulin, spinasterol, stigmasterol and stigmast-7-enol isolated (*Planta Med.* 1976, *30*, 151); C_{31}-C_{35} alkanes, C_{52-56} wax esters (hexacosanyl hexacosanoate as major constituent), stigmast-22-en-3-ol and quercetin-3-rutinoside isolated from aerial parts (*Indian J. Chem.* 1978, *16*B, 439); cycloart-23-ene-3β,25-diol isolated (*Planta Med.* 1978, *34*, 109).

TRICHOSANTHES (Cucurbitaceae)

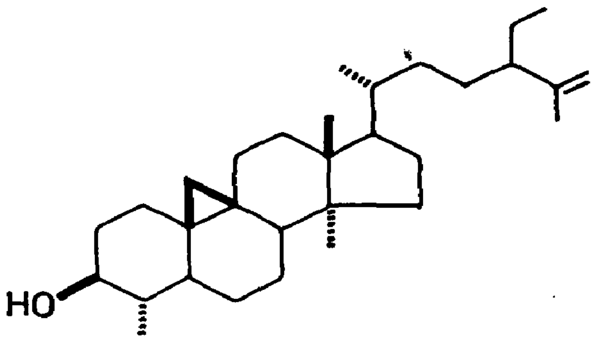
T. bracteata (Lam.) Voight; see *T. tricuspidata* Lour.

T. palmata Roxb.; see *T. tricuspidata* Lour.

T. tricuspidata Lour. syn. *T. bracteata* (Lam.) Voigt, *T. palmata* Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 247).

A new methylsterol - cyclotrichosantol - isolated from leaves along with cycloeucalenol (*J. Org. Chem.* 1973, *38*, 3688); a triterpene - trichotetrol, mp. 289° - isolated from roots which was not characterised (*Curr. Sci.* 1974, *43*, 116).

NEW COMPOUNDS



Cyclotrichosantol

TRIFOLIUM (Papilionaceae)

T. alexandrinum L.

Eng. - Barseem, Egyptian clover.

Biochanin A (0.013), genistein (0.025%) and formononetin found in plant (*Indian J. Animal Sci.* 1975, *45*, 622; *Chem. Abstr.* 1977, *87*, 65305 u; *J. Agric. Sci.* 1976, *87*, 467; *Chem. Abstr.* 1977,

86, 86173 u); coumesterol also isolated (*J. Agric. Sci.* 1976, *87*, 467; *Chem. Abstr.* 1977, *86*, 86173 u).

Distribution : Introduced and cultivated almost throughout India, upto 1500 m.

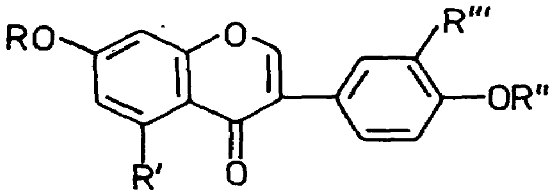
T. fragiferum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 420).

Soyasapogenols A,B,C,D,E and medicagenic acid estimated as trimethylsilyl ethers by GLC in roots and seeds; sapogenol A found only in seeds (*J. Chromatogr.* 1978, *148*, 517; *Chem. Abstr.* 1978, *88*, 117770 j).

T. pratense L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 421).

Trifoside isolated and characterised as 5-hydroxy-7-methoxy-isoflavone-4'-O-β-D-glucopyranoside (*Khim. Prir. Soedin.* 1972, *8*, 806; *Chem. Abstr.* 1973, *78*, 94807 d); plant contained coumarins, hydroxycoumarins (0.217) and melitotic acid (0.706%) at flowering time (*Nauka-Prakt. Farm.* 1974, 57; *Chem. Abstr.* 1977, *86*, 40154 k); p-coumaric, chlorogenic and 3-p-coumaroylquinic acids isolated (*Khim. Prir. Soedin.* 1976, *12*, 258; *Chem. Abstr.* 1976, *85*, 59603 g); isochavibetol (5-(propen-1'-yl)-guaiacol) and its ethyl ether isolated from roots (*Bioorg. Khim.* 1978, *4*, 563; *Chem. Abstr.* 1978, *89*, 39385 s); calycosin and pseudobaptigenin isolated and identified as 3',7-dihydroxy-4'-methoxyisoflavone and 7-hydroxy-3',4'- methylenedioxy-isoflavone respectively (*Phytochemistry* 1978, *17*, 1683); 5,4'-dihydroxy-6,7-methylenedioxyisoflavone and its 4'-O-β-D-glucoside isolated from roots (*Bioorg. Khim.* 1979, *5*, 228; *Chem. Abstr.* 1979, *90*, 148457 h).

NEW COMPOUNDS



Trifoside
R = Me, R' = OH, R'' = Glu, R''' = H
Calycosin
R,R' = H, R'' = Me, R''' = OH
Pseudobaptigenin
R,R' = H, R'',R''' = -CH_2O-

BIOLOGICAL ACTIVITY

Isochavibetol and its ethyl ether had high growth-inhibiting activity, suppressing wheat coleoptile cell elongation induced by indoleacetic acid (*Bioorg. Khim.* 1978, *4*, 563; *Chem. Abstr.* 1978, *89*, 39385 s).

T. repens L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi,

1990, p. 421).

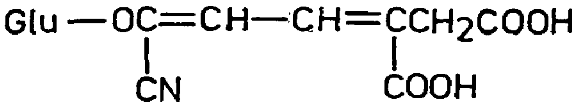
Linamarin and lotaustralin isolated (*Phytochemistry* 1971, *10*, 3005); detection of coumarins, hydroxycoumarins (0.337) and melitotic acid (0.826%) at flowering time (*Nauka-Prakt. Farm.* 1974, 57; *Chem. Abstr.* 1977, *86*, 40154 k); glyceric acid shown as major organic acid in ladino clover by GLC and TLC (*Phyton,* Buenos Aires 1976, *34*, 89; *Chem. Abstr.* 1977, *86*, 167918 t); essential oil from flowers contained terpenoids (18.8%) which consisted of α-pinene (0.3), camphene (0.4), β-pinene (0.1), p-menthene (0.3), limonene (3.0), α-terpinene (0.3), p-cymene (0.7), β-caryophyllene (1.1), β-sesquiphellandrene (0.2), trans-linalool oxide (1.4), cis-linalool oxide (1.3), linalool (5.4), linalyl acetate (0.7), α-terpineol (0.6), α-terpinyl acetate (1.0), citronellol (0.5), nerol (0.3) and geraniol (1.2%) (*Agric. Biol. Chem.* 1977, *41*, 1785; *Chem. Abstr.* 1977, *87*, 197287 z).

TRIGLOCHIN (Juncaginaceae)

T. maritimum L. (*maritima*) (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 248).

A new cyanogenic glucoside - triglochinin - isolated from flowers and characterised as 1-O-[-β-D-glucopyranosyl]-1-cyano-4,5-dicarboxy-1,3-pentadiene (*Phytochemistry* 1970, *9*, 845).

NEW COMPOUNDS



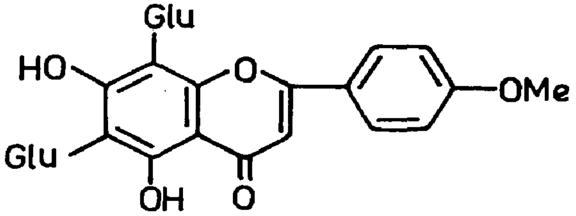
Triglochinin

TRIGONELLA (Papilionaceae)

T. corniculata (L.) L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1956, p. 422).

Diosgenin, tigogenin and gitogenin isolated from leaves and flowers (*Indian J. Appl. Chem.* 1971, *34*, 208; *Chem. Abstr.* 1972, *77*, 85529 s); two new flavone C-glycosides - 6,8-di-C-β-D-glucopyranosylacacetin and its 2''-monoacetyl derivative - isolated from seeds (*Indian J. Chem.* 1972, *10*, 26); vitexin, apigenin-C-glucoside, ethyl-β-D-galactopyranoside, apigenin-6,8-di-C-monoglucoside and its monoacetate isolated from seeds (*Curr. Sci.* 1973, *42*, 421); ethyl-α-D-galactopyranoside isolated from leaves (*Planta Med.* 1974, *26*, 26).

NEW COMPOUNDS

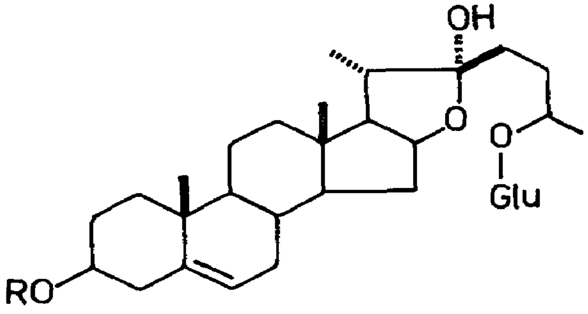


6,8-Di-C-β-D-glucopyranosylacacetin

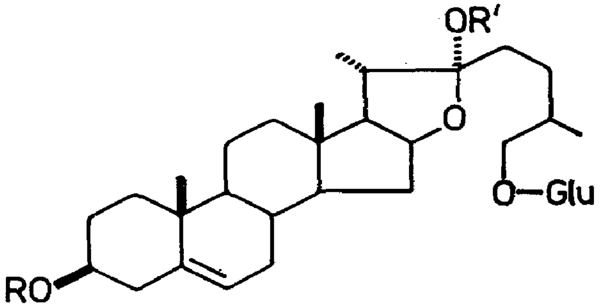
T. foenum-graecum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 422).

Saponin from stems yielded on hydrolysis a sapogenin, mp. 186°, while that from leaves gave diosgenin, tigogenin and gitogenin (*Indian J. Appl. Chem.* 1971, *34*, 208; *Chem. Abstr.* 1972, *77*, 85529 s; *Khim. Farm. Zh.* 1976, *10*, 70; *Chem. Abstr.* 1976, *85*, 68172 t); tigogenin, neotigogenin, diosgenin, yamogenin and gitogenin isolated from seeds (*Egypt. J. Chem.* 1972, *15*, 617; *Chem. Abstr.* 1974, *80*, 68411 s; *Planta Med.* 1973, *24*, 367); 4-hydroxyisoleucine isolated from seeds (*Phytochemistry* 1973, *12*, 1707); vitexin and isovitexin isolated from seeds (*Curr. Sci.* 1973, *42*, 421); saponaretin, homoorientin, vitexin, vicenin-1 and vicenin-2 isolated from seeds (*Phytochemistry* 1973, *12*, 2548); β-sitosterol, kaempferol and quercetin isolated from leaves (*Indian J. Pharm.* 1975, *37*, 100); a new 3,26-bisglycoside - trigonelloside C - isolated (*Khim. Prir. Soedin.* 1976, *12*, 268; *Chem. Abstr.* 1976, *85*, 106634 e); a new flavone-C-glycoside - vitexin-2''-O-p-coumarate - isolated (*Phytochemistry* 1976, *15*, 351); neotigogenin and neogitogenin obtained by hydrolysis of glycosides (*Khim. Farm. Zh.* 1976, *10*, 70; *Chem. Abstr.* 1976, *85*, 68172 t); detection of diosgenin by GLC (*Indian J. Pharm.* 1977, *39*, 62); 7-acetoxy-4-methylcoumarin isolated (*Indian J. Chem.* 1977, *15*B, 94); yamogenin tetrosides B and C isolated from seeds and characterised (*Khim. Pharm. Zh.* 1977, *11*, 65; *Chem. Abstr.* 1977, *87*, 180685 e); saponins - graecunin A, graecunin B and graecunin C - isolated from leaves; graecunin B identified as diosgenin glycoside having glucose, xylose and rhamnose in ratio of 4:1:2 (*J. Indian Chem. Soc.* 1977, *54*, 1135); graecunins H,I,J,K,L,M and N isolated from seeds; these glycosides of diosgenin differ in sugar units attached; glucose and rhamnose present in graecunins H,I and J in ratios of 5:2, 6:3 and 6:4 respectively whereas graecunin K also contained glucose and rhamnose and graecunin N contained glucose, arabinose, xylose and rhamnose (*Indian J. Chem.* 1978, *16*B, 1134); fenugrin B from seeds, on hydrolysis yielded diosgenin, glucose, arabinose and rhamnose (*Indian Drugs* 1979, *16*, 149).

NEW COMPOUNDS



Trigonelloside C
R = Glu[(2→1)Rha](4→1)Rha



Yamogenin tetroside B
R = Glu[(2→1)Rha](4→1)Rha, R' = Me
Yamogenin tetroside C
R = Glu[(2→1)Rha](4→1)Rha, R' = H

T. occulta Delile ex DC. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 249).

β-Sitosterol and quercetin isolated (*Indian J. Pharm.* 1976, *38*, 25); diosgenin (0.32), gitogenin (0.04) and tigogenin (0.01%) isolated from seeds (*Lloydia* 1976, *39*, 244).

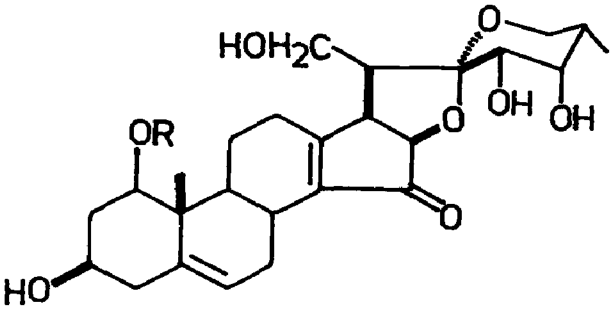
TRILLIUM (Trilliaceae)

T. tschonoskii Maxim.

Trillenoside isolated and its structure determined (Jpn. 7,751,011 (1977) April 23; *Chem. Abstr.* 1977, *87*, 65494 e).

Distribution : Sikkim, alt. 3000-3300 m, Bhutan and Mishmi Hills in Meghalaya.

NEW COMPOUNDS



Trillenoside

R = Ara(3→1)Xyl(2→1)Rha(3→1)Apiose

TRISETUM (Poaceae)

T. flavescens (L.) Beauv. syn. *Avena sikkimensis* Hook.f.

Eng. - Oat grass.

Sitosterol, cholesterol, campesterol, stigmasterol, cholest-5,7-dien-3-ol and stigmast-7,24(28)-dienol isolated from Austrian plant (*Monatsh. Chem.* 1978, *109*, 1167; *Chem. Abstr.* 1979, *90*, 3148 y).

Distribution : Sikkim Himalayas, alt. 3000-3300 m.

TRITICUM (Poaceae)

T. aestivum L. syn. *T. vulgare* Vill. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 249).

Isoorientin, lutonarin, lucenin-3, vicenin-2, wyomin (7′-O-rutinosyl-6-C-*β*-D-glucopyranosyl luteolin), isoswertisin-4′-O-glucoside and tricin isolated from leaves (*Phytochemistry* 1971, *10*, 3185); a hybrid with Secale cereale yielded hexacosane, sitosterol and *β*-sitostanol (*Phytochemistry* 1972, *11*, 2656).

T. vulgare Vill.; see *T. aestivum* L.

TURNERA (Turneraceae)

T. ulmifolia L.

Eng. - West Indian Holly, Sagerose; Mar. - Bhinjira; Mal. - Cheravatholi; Oriya - Basanti.

Caffeine (1-1.2%) obtained from seeds (*Indian J. Bot.* 1979, *2*, 118; *Chem. Abstr.* 1979, *91*, 207415 p).

Distribution : West Bengal, Orissa, peninsular India particularly on the coast.

TYLOPHORA (Asclepiadaceae)

T. asthmatica W. & A.; see *T. indica* (Burm.f.) Merrill

T. dalzellii Hook.f.

Three new alkaloids A,B and C isolated; alkaloids B and C characterised as desmethyltylophorine and desmethyltylophorinine respectively (US 3,497,593 (1970) Feb. 24; *Chem. Abstr.* 1970, *72*, 125054 p; *J. Pharm. Sci.* 1971, *60*, 1725).

Distribution : Konkan and Malabar region.

BIOLOGICAL ACTIVITY

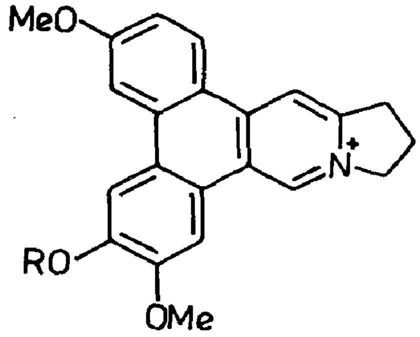
Desmethyltylophorinine possessed antileukaemic activity (*J. Pharm. Sci.* 1971, *60*, 1725).

T. indica (Burm.f.) Merrill syn. *T. asthmatica* W. & A. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 423).

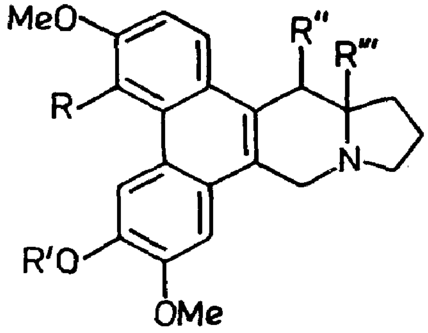
Alcoholic extract and total alkaloids produced CNS depression in near lethal dose. Both produced myocardial depression and fall of blood pressure in relatively large doses. Extract produced non-specific relaxation of smooth muscles such as ileum, uterus and tracheal ring chain of guinea pigs, rats and dogs and antagonised contractile effects of histamine and acetylcholine. Total alkaloids (10 mg/kg, p.o.) prolonged the survival rate of skin homografts in rats (*Indian J. Pharmacol.* 1975, *7*, 13).

Three alkaloids A,B and C isolated; alkaloids B and C characterised as desmethyltylophorine and desmethyltylophorinine respectively (US 3,497,593 (1970) Feb. 24; *Chem. Abstr.* 1970, *72*, 125054 p; *J. Pharm. Sci.* 1971, *60*, 1725); crystal structure of tylophorinidine and relative stereochemistry of tylophorinine and tylophorinidine (*Tetrahedron* 1973, *29*, 891; *Barc*-764, 1974, 6; *Chem. Abstr.* 1975, *82*, 171257 m, 171258 n); (+)septicine and (+)isotylocrebrine also isolated from fresh leaves (*Tetrahedron* 1973, *29*, 891); dehydrotylophorine, anhydrodehydrotylophorinine and anhydrodehydrotylophorinidine isolated (*Indian J. Chem.* 1973, *11*, 1215); stereochemistry of tylophorinine and tylophorinidine (*Indian J. Chem.* 1974, *12*, 886); absolute configuration of tylophorine (*J. Chem. Soc.* Perkin 1 1974, 1161); tylophorine and tylophorinine content in leaves is a function of plant growth phase and is highest during flowering period (*Planta Med.* 1975, *27*, 333); γ-fagarine and skimmianine isolated from roots and aerial parts (*Phytochemistry* 1977, *16*, 1125).

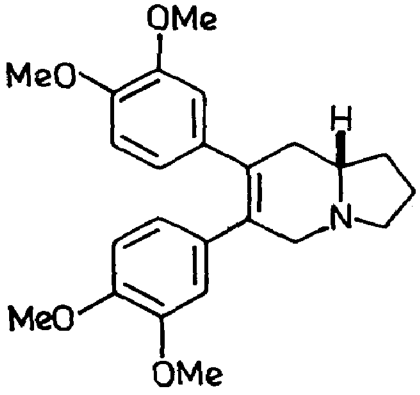
NEW COMPOUNDS



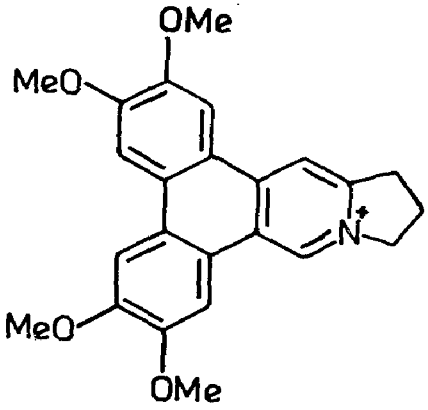
Anhydrodehydrotylophorinine
R = Me
Anhydrodehydrotylophorinidine
R = H



Isotylocrebrine
R = OMe, R' = Me, R'' = H, R''' = α-H
Tylophorinidine
R,R' = H, R'' = α-OH, R''' = β-H



Septicine



Dehydrotylophorine

BIOLOGICAL ACTIVITY

Tylophorine caused CNS depression characterised by ptosis, sedation and decreased motor activity. It also potentiated pentobarbital sleeping time and effect of subanalgesic doses of morphine in rats. It also showed anti-inflammatory effects in rat hind paw oedema, granuloma pouch and cotton pellet implantation tests. It had no cardiovascular effects in frogs or dogs (*Indian J. Med. Res*. 1979, *69*, 513).

T. mollissima Wight

Tylophorinidine and tylophorinine isolated from roots (*Sheng Wu Hua Hsueh Yu Sheng Wu Li Hsueh Pao* 1977, *9*, 131; *Chem. Abstr*. 1978, *88*, 186109 n).

Distribution : Nilgiris and Pulney Hills in south India.

UMBILICARIA (Umbilicariaceae)

U. indica Frey

Lecanoric acid isolated (*Curr. Sci.* 1976, *45*, 517).

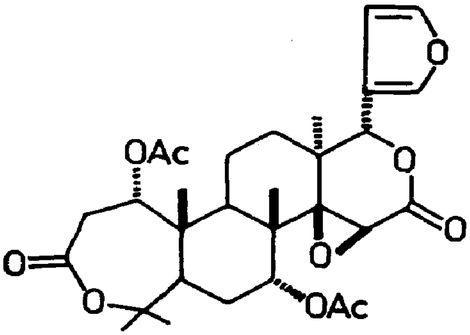
Distribution : India (exact locality not mentioned).

UNCARIA (Rubiaceae)

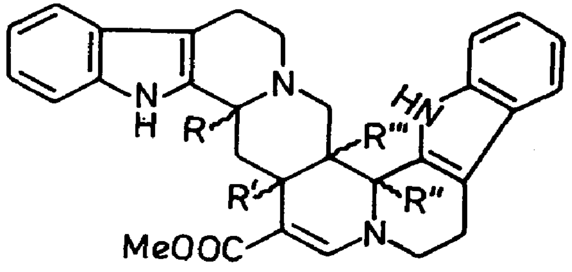
U. gambir (Hunt) Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 424).

New diastereoisomeric indole alkaloids - roxburghines A,B,C,D and E - isolated from leaves and stems; structure of roxburghine D proposed (*Tetrahedron* 1970, *26*, 2259); stereoselective total synthesis of roxburghine D (*Chem. Commun.* 1972, 786; *Chem. Ber.* 1975, *108*, 248); absolute configurations of roxburghines B,C and E established (*Gazz. Chim. Ital.* 1973, *103*, 153; *Chem. Abstr.* 1973, *79*, 42724 a; *Helv. Chim. Acta* 1976, *59*, 2249); mexicanolide isolated from seeds and identified (*Occas. Pap.-Nanyang Univ. Coll. Grad. Stud. Inst. Nat. Sci.* 1978, *40*, 18; *Chem. Abstr.* 1979, *90*, 164766 p); isolation and crystal structure of 7α-acetoxydihydronomilin (*Can. J. Chem.* 1978, *56*, 1020).

NEW COMPOUNDS



7-α-Acetoxydihydronomilin



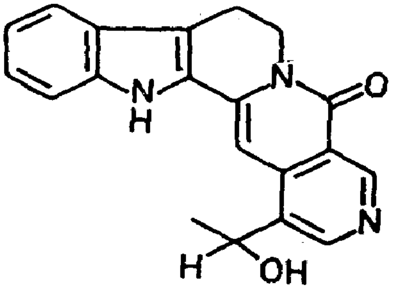
Roxburghine B
R = β-H, R',R''' = α-H, R'' = β-Me
Roxburghine C
R,R' = α-H, R'' = α-Me, R''' = β-H
Roxburghine D
R,R''' = β-H, R' = α-H, R'' = α-Me
Roxburghine E
R,R''' = β-H, R' = α-H, R'' = β-Me

U. homomalla Miq.

Angustine and angustoline isolated from leaves and their structures elucidated (*Phytochemistry* 1974, *13*, 973); speciophylline, uncarine F, isopteropodine and pteropodine isolated from leaves and identified (*Planta Med.* 1977, *31*, 26).

Distribution : Jaintia Hills, Meghalaya.

NEW COMPOUNDS



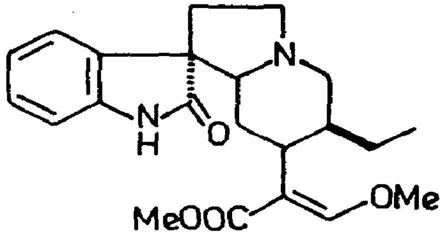
Angustoline

U. macrophylla Wall.

Isorhynchophylline, rhynchophylline, corynoxine A and corynoxine B isolated from leaves (*Phytochemistry* 1973, *12*, 2795).

Distribution : Bhutan, Assam and Khasi Hills, ascending to 1200 m.

NEW COMPOUNDS



Corynoxine A
Corynoxine B (7-epimer)

URTICA (Urticaceae)

U. dioica L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 251).

Extraction of chlorophyll from leaves and production of water- soluble sodium chlorophyllin (Rom. 63,710 (1976) Mar. 20; *Chem. Abstr.* 1979, *91*, 216810 r); a neutral and an acidic carbohydrate protein polymer isolated from leaves; glycoprotein contained serine-O-galactoside glycopeptide bond (*Phytochemistry* 1978, *17*, 1885).

U. pilulifera L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 251).

Indole alkaloid - bufotenine - isolated (*Acta Bot. Croat.* 1972, *31*, 109; *Chem. Abstr.* 1973, *78*, 1962 n).

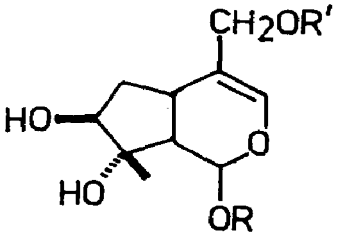
VALERIANA (Valerianaceae)

V. jatamansi Jones syn. *V. wallichii* DC. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi &

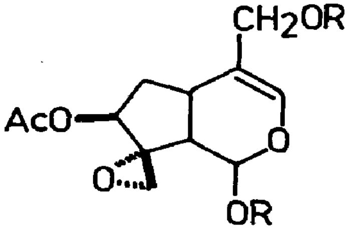
Mehrotra, PID, New Delhi, 1990, p. 425).

An iridoid glucoside (I) isolated and characterised (Ger. 1,962,624 (1971) June 24; *Chem. Abstr.* 1971, *75*, 77234 k); a sesquiterpene analogue of α-fenchene - sesquifenchene - isolated from root oil and its structure determined (*Chem. Ind.* 1972, 803); a bicyclic sesquiterpene from plant identified as 9(γ,γ-dimethylallyl)-α-fenchene by synthesis (*C. R. Acad. Sci*. Ser. C 1975, *275*, 503; *Chem. Abstr.* 1973, *78*, 30016 n); absolute configurations of valerosidatum and didrovaltratum (*Tetrahedron* 1974, *30*, 2317); an acylated linarin (acacetin-7-O-β-rutinoside) isolated as mixture of two isovalerate esters wherein isovaleryl moiety attached to 2'''- and 3'''-hydroxyls of rhamnose unit of linarin (*Phytochemistry* 1977, *16*, 1110).

NEW COMPOUNDS



I
R = Glu, R' = Isovaleryl
Valerosidatum
R = Isovaleryl, R' = Glu



Didrovaltratum
R = Isovaleryl

Sesquifenchene

BIOLOGICAL ACTIVITY

Iridoid glucoside (I) showed CNS depressant activity at 31.6-100 mg/kg doses in mice (Ger. 1,962,624 (1971) June 24; *Chem. Abstr.* 1971, *75*, 77234 k).

V. wallichii DC.; see *V. jatamansi* Jones

VANASUSHAVA (Apiaceae)

V. pedata (Wt.) Mukh. & Const. syn. *Heracleum pedatum* Wt.

Osthenol, osthol, columbianadin, columbianetin, sprengelianine, marmesin, suberosin, demethylsuberosin, psoralen, imperatorin, cynidicine, xanthotoxin and isopimpinellin isolated (*Bull. Mus. Nat. Hist. Naturelle. Sci. Phys.-Chim.* 1977, *12*, 17; *Chem. Abstr.* 1978, *88*, 166723 e).

Distribution : Hills of south India.

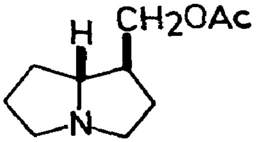
VANDA (Orchidaceae)

V. cristata Lindl.

A new alkaloid - laburnine acetate -isolated and characterised (*Acta Chem. Scand.* 1969, *23*, 3352).

Distribution : Himalayas from Kumaon to Bhutan, alt. 1000-2000 m.

NEW COMPOUNDS



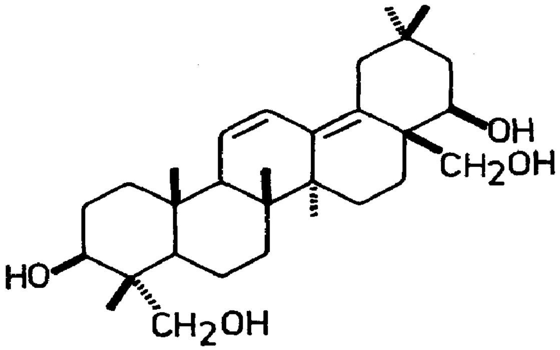
Laburnine acetate

VERBASCUM (Scrophulariaceae)

V. chinensis (L.) Sant. syn. *Celsia coromandeliana* Vahl (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 57).

A new sterol - celsianol, mp. 166° - isolated and its structure established as stigmasta-5,9(11)-dien-3β-ol (*J. Indian Chem. Soc.* 1970, *47*, 1063); a constant melting sterol, mp. 164° (celsianol) shown to be mixture of 5,6-dihydrostigmasterol and α-spinasterol; three new saponins - celsiosides A,B and C - isolated which yielded on hydrolysis celsiogenins A,B and C - respectively; the sugars obtained in each case were glucose, fucose and arabinose in molar ratios 1:1:1, 1:1:1 and 2:1:1 respectively (*Indian J. Chem.* 1974, *12*, 304); structure of celsiogenin C determined as olean-11,13(18)-dien-3β,22β,23,28-tetrol, whereas celsiogenins A and B identified as olean-12,17(18)-dien-3β,23-diol and olean-11,13(18)-dien-3β,23,28-triol respectively (*Indian J. Chem.* 1974, *12*, 907).

NEW COMPOUNDS

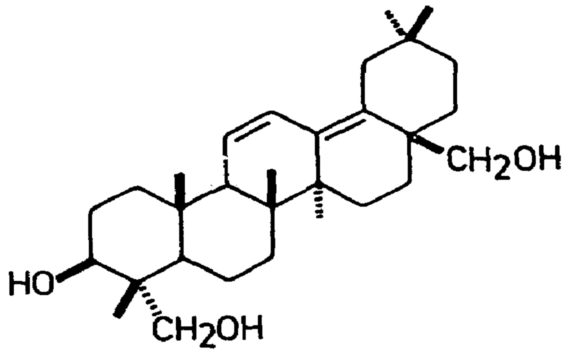


Celsiogenin C

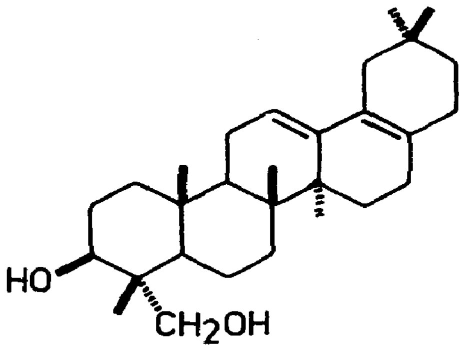
V. thapsus L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 253).

Veratric acid and α-spinasterol isolated; saikogenin A, triterpenes I and II along with benzyl alcohol and 5-(ethoxymethyl)furfural isolated from hydrolysed extract; structures of triterpenes determined (*An. Quim.* 1978, *74*, 311; *Chem. Abstr.* 1978, *89*, 163786 n); seed oil contained palmitic, stearic, oleic, linoleic, linolenic, arachidic and behenic acids besides β-sitosterol and ergosta-7-en-3β-ol (*An. Quim.* 1978, *74*, 1566; *Chem. Abstr.* 1979, *91*, 35696 n).

NEW COMPOUNDS



Triterpene I



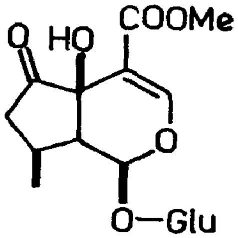
Triterpene II

VERBENA (Verbenaceae)

V. officinalis L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi and Mehrotra, PID, New Delhi, 1990, p. 427).

A new iridoid glycoside - hastatoside - isolated and its structure determined (*Tetrahedron Lett.* 1973, 1463).

NEW COMPOUNDS



Hastatoside

VERBESINA (Asteraceae)

V. encelioides (Cav.) Gray

Pseudotaraxasterol, its acetate, pseudotaraxastenone, hentriacontanol, β-sitosterol and its glucoside isolated (*Indian J. Chem.* 1978, *16*B, 1133).

Distribution : Introduced into India, naturalised in north India and elsewhere.

VERNICIA (Euphorbiaceae)

V. fordii (Hemsl.) Airy Shaw syn. *Aleurites fordii* Hemsl.

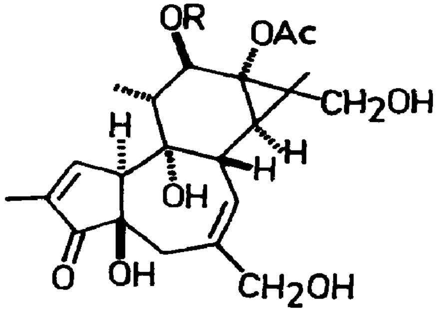
Eng. - Tung oil tree.

Two new phorbol esters - 13-O-acetyl-16-hydroxyphorbol and 12-O-palmitoyl-13-O-acetyl-16-hydroxyphorbol - isolated from fruits (*Chem. Pharm. Bull.* 1974, *22*, 971; *Phytochemistry*

1975, *14*, 509).

Distribution : Introduced into India, cultivated in tea estates of Bengal, Assam, Bihar, Meghalaya and Mysore.

NEW COMPOUNDS



13-O-Acetyl-16-hydroxyphorbol

R = H

12-O-Palmitoyl-13-O-acetyl-16-hydroxyphorbol

R = $CO(CH_2)_{14}Me$

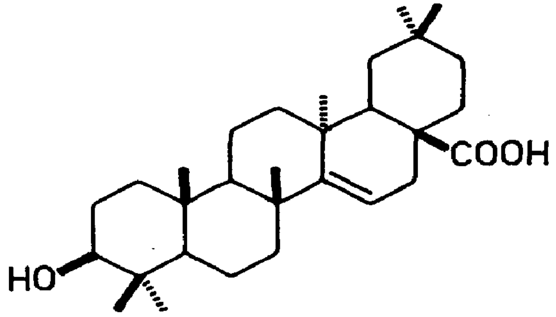
V. montana Lour. syn. *Aleurites montana* (Lour.) E. H. Wils.

Eng. - Wood oil tree.

A new triterpene acid - aleuritolic acid, mp. 241° - isolated along with friedelin, β-sitosterol and betulinic acid and its structure determined (*J. Indian Chem. Soc.* 1969, *46*, 1063; *Tetrahedron* 1970, *26*, 3017).

Distribution : Introduced into India, cultivated in Assam, West Bengal, Bihar, Mysore and Himachal Pradesh, specially in tea gardens.

NEW COMPOUNDS



Aleuritolic acid

VERNONIA (Asteraceae)

V. anthelmintica Willd.; see *Centratherum anthelminticum* (L.) Kuntze

V. arborea Buch.-Ham. syn. *V. arborea* Buch.-Ham. var. *wightiana* Hook.f., *V. monosis* Benth. ex Clarke

Assam - Maskoita; Nagaland - Pachet; Kachar - Semkhari-phang.

Bark yielded sitosterol and leaves yielded β-amyrin (*Indian J. Chem.* 1977, *15*B, 291).

Distribution : Assam, Meghalaya and elsewhere in north-eastern India and Western Ghats from Konkan southwards.

V. arborea Buch..-Ham. var. *wightiana* Hook.f.; see *V. arborea* Buch.-Ham.

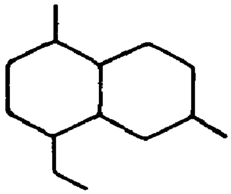
V. monosis Benth. ex Clarke; see *V. arborea* Buch.-Ham.

VETIVERIA (Poaceae)

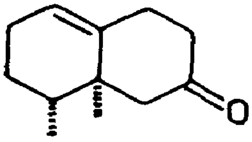
V. zizanioides (L.) Nash syn. *Andropogon squarrosus* Hook.f. (non L. f.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 428).

A new norterpenoid (I) with a rare khusilane skeleton isolated from Bharatpur variety (*Experientia* 1970, *26*, 590); a new C_{14} ketone - khusimone, mp. 78° - isolated from vetiver oil (*Flavour Ind.* 1970, *1*, 623; *Chem. Abstr.* 1971, *74*, 23019 e); cyclocopacamphenol, epicyclocopacamphenol (C-II epimer), vetiselinenol and zizanol isolated and their structures elucidated (*Tetrahedron Lett.* 1970, 231); zizanene and levojunenol isolated from oil (*Tetrahedron Lett.* 1970, 4651); absolute structure of a new sesquiterpene alcohol - epikhusinol - isolated from oil (*Indian J. Chem.* 1972, *10*, 1127); two new C_{12} ketones - (+)(1 S,10 R)-1,10-dimethylbicyclo[4.4.0]-dec-6-en-3-one (II) and (+)(6S,10S)-6,10-dimethylbicyclo [4.4.0]-dec-1-en-3-one (III) - isolated and characterised (*Helv. Chim. Acta* 1972, *55*, 2371); structures of zizanoic acid and epizizanoic acid isolated from essential oil (*Tetrahedron* 1973, *29*, 945); revision of structures of sesquiterpenes (IV-VII) (*Tetrahedron Lett.* 1975, 2973); method for removal of khusol from vetiver oil (*Riechst., Aromen, Koerperpflegem* 1976, *26*, 185; *Chem. Abstr.* 1977, *86*, 60393 r); separation of epikhusinol from oil by TLC (*Riechst., Aromen, Kosmet.* 1977, *27*, 76; *Chem. Abstr.* 1977, *87*, 44129 z); allokhusiol, zizaene and prezizaene isolated from oil; structure of allokhusiol determined (*Indian J. Chem.* 1978, *16*B, 20); khusiol isolated from oil and its structure determined (*Indian J. Chem.* 1978, *16*B, 23); new sesquiterpene alcohols - isovalencenol, vetiselinenol and isovetiselinenol - isolated from oil and their structures elucidated (*Indian J. Chem.* 1978, *16*B, 260);

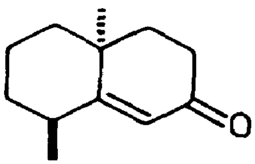
NEW COMPOUNDS



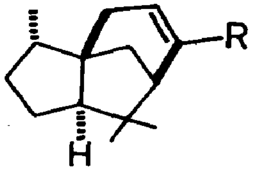
I



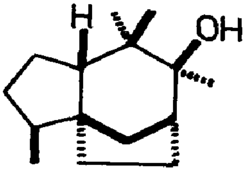
II



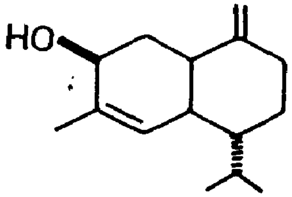
III



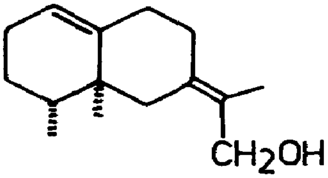
IV
R = Me
V
R = CH_2OH
VI
R = CHO
VII
R = COOH



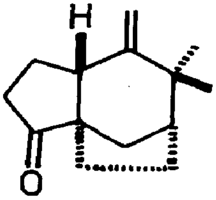
Allokhusiol



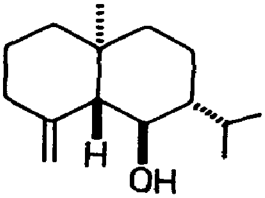
Epikhusinol



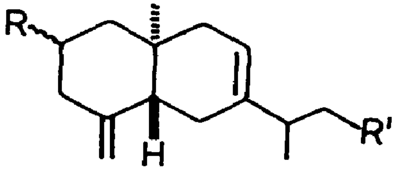
Isovalencenol



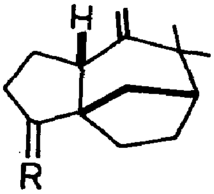
Khusimone



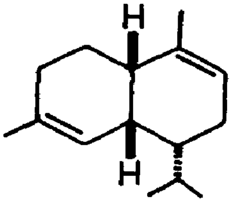
Levojunenol



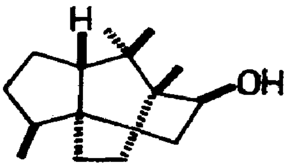
Vetiselinenol
R = H, R′ = OH
Isovetiselinenol
R = OH, R′ = H



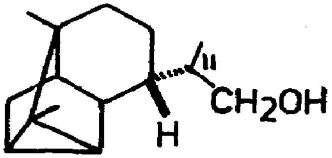
Zizanoic acid
R = β-COOH,H
Epizizanoic acid
R = α-COOH,H



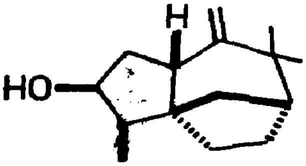
Zizanene



Khusiol



Cyclocopacamphenol



Zizanol

VIBURNUM (Caprifoliaceae)

V. cordifolium Wall. ex DC; see *V. nervosum* D. Don

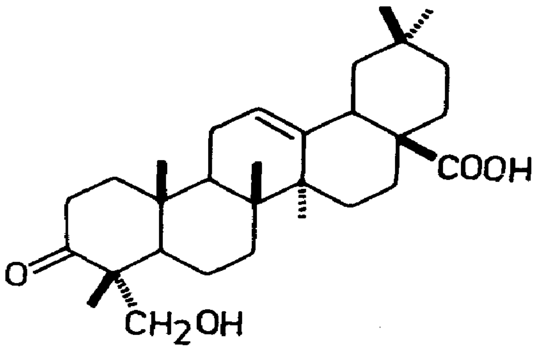
V. erubescens Wall. ex DC.

Alcoholic extract showed antiviral activity (*Phytochemistry* 1974, *13*, 666).

A new triterpenic acid - hederagenic acid, characterised as 3-oxo-23-hydroxyolean-12-en-28-oic acid - isolated besides tritriacontane, β-amyrin, sitosterol, oleanonic, oleanolic and 2α-hydroxyursolic acids (*Phytochemistry* 1974, *13*, 666).

Distribution : Himalayas from Garhwal to Bhutan, alt. 1800-3000 m and Nilgiris, alt. 1500-2400 m.

NEW COMPOUNDS



Hederagenic acid

V. grandiflorum Wall. ex DC. syn. *V. nervosum* sensu Clarke (non D. Don)

P. - Anrola; H. - Telanu, Thekla; Kumaon - Telam, Timoi.

β-Sitosterol isolated from aerial parts (*Indian J. Chem.* 1976, *14*B, 475); cetyl alcohol, ceryl alcohol, α- and β-amyrins, oleanolic, ursolic and 2α-hydroxyursolic acids, quercetin, scopoletin and glucose isolated (*Indian J. Pharm. Sci.* 1978, *40*, 63).

Distribution : Himalayas from Kashmir to Sikkim, alt. 3000-4000 m.

V. nervosum Clarke; see *V. grandiflorum* Wall ex DC.

V. nervosum D. Don syn. *V. cordifolium* Wall ex DC.

Bergenin isolated from roots (*Indian J. Pharm. Sci.* 1979, *41*, 120).

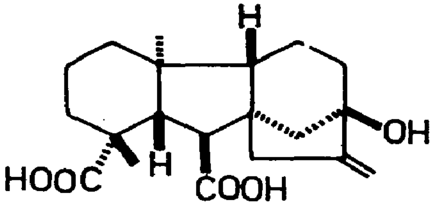
Distribution : Himalayas from Kumaon to Bhutan, alt. 2600-3500 m.

VICIA (Papilionaceae)

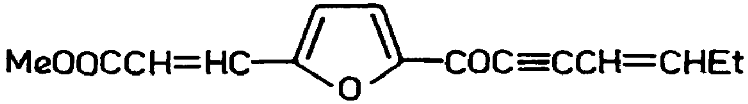
V. faba L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 429).

Wyerone, mp. 63° (0.001%) isolated from seeds (*Neth. J. Plant Pathol.* 1969, *75*, 72; *Chem. Abstr.* 1973, *78*, 82075 a); L-dopa isolated (Ger. 2,333,375 (1972) Jul. 14; *Chem. Abstr.* 1974, *80*, 100195 n); principal base identified as vicine (*Qual. Plant Foods Hum. Nutr.* 1976, *26*, 331; *Chem. Abstr.* 1977, *86*, 40216 g); medicarpin, a phytoalexin isolated (*Nature* 1976, *262*, 318); gibberellin A (GA_{17}), GA_{19}, GA_{20}, GA_{29}, GA_{44} and 13-hydroxy-GA_{12} (GA_{53}) identified in immature seeds (*Planta* 1979, *146*, 101; *Chem. Abstr.* 1979, *91*, 87307 f).

NEW COMPOUNDS



13-Hydroxy-GA12



Wyerone

BIOLOGICAL ACTIVITY

Wyerone was active against a number of phytopathogens and dermatophytes (*Neth. J. Plant Pathol.* 1969, 75, 72; *Chem. Abstr.* 1973, *78*, 82075 a).

V. sativa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 429).

Leaves contained total sterols (1.55), free sterols (1.22), esterified sterols (0.18) and sterol glucosides (0.063 mg/g, dry wt.); β-sitosterol was most abundant in all fractions whereas esterified sterol fraction was rich in 7-dehydrostigmasterol (*Riv. Ital. Sostanze Grasse* 1978, *55*, 218; *Chem. Abstr.* 1979, *90*, 36319 h).

V. sepium L.

Eng. - Bush vetch, Hedge vetch.

Kaempferol-3-glucosido-7-rhamnoside and 3,7-diglucoside isolated from leaves (*Phytochemistry* 1972, *11*, 3065).

Distribution : Kashmir, temperate region.

VIGNA (Papilionaceae)

V. aconitifolia (Jacq.) Marechal syn. *Phaseolus aconitifolius* Jacq. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 189).

Polysaccharides from seeds contained glucose, galactose and arabinose (*J. Indian Chem. Soc.* 1973, *50*, 774).

V. catjang (Burm.f.) Walp.; see *V. unguiculata* (L.) Walp.

V. cylindrica (L.) Skeels; see *V. unguiculata* (L.) Walp.

V. radiata (L.) Wilczek var. *radiata* syn. *Phaseolus radiatus* L., *P. aureus* Roxb., *P. radiatus* L. var. *aureus* (Roxb.) Prain, *P. mungo* auct. (non L.) (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 430).

Isolation of γ-glutamyl-γ-glutamylmethionine from seeds (*Agric. Biol. Chem.* 1972, *36*, 2621; *Chem. Abstr.* 1973, *78*, 133395 q); 3-(2-furoyl)alanine and L-pipecolic acid isolated from seeds (*Agric. Biol. Chem.* 1973, *37*, 2923; *Chem. Abstr.* 1974, *80*, 80078 w); vitexin and β-sitosterol isolated from seed coat (*Curr. Sci.* 1973, *42*, 605); seed protein of mung bean contained lysine (6.82), valine (5.67), leucine (5.01) and phenylalanine (5.42%); seedling

protein contained cystine (4.43), methionine (1.65%) and high levels of valine, isoleucine, phenylalanine, threonine and lysine (*Prikl. Biokhim. Mikrobiol.* 1978, *14*, 429); *Chem. Abstr.* 1978, *89*, 87182 v); phosphatidylinositol, sulpholipids, phosphatidic acid, mono- and di-galactosyl diglycerides, phosphatidylethanolamine, phosphatidylcholine and diphosphatidylglycerol identified as polar lipid components of galacto-lipids, linolenic acid was major (74.0%) fatty acid component in digalactosyl diglyceride (*Plant Biochem. J.* 1978, *5*, 37; *Chem. Abstr.* 1979, *90*, 36340 h).

V. umbellata (Thunb.) Ohwi & Ohashi syn. *Phaseolus calcaratus* Roxb., *P. ricciardianus* Tenore

H. - Sutri, Ghurush; Kumaon - Ghurush, Gurounsk; P. - Ghurush; Santhal - Sutri; Khasi - Rumbaiya; Nep. - Sitamas, Paumaia.

Polysaccharides from seeds contained glucose, galactose and arabinose (*J. Indian Chem. Soc.* 1973, *50*, 774).

Distribution : Throughout India in plains, cultivated or wild, ascending to 1500 m in hills.

V. unguiculata (L.) Walp. syn. *V. cylindrica* (L.) Skeels *V. catjang* (Burm. f.) Walp. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 255).

Antifungal compound - demethylhomopterocarpin - isolated from etiolated hypocotyls inoculated with tobacco necrosis virus (*Phytochemistry* 1974, *13*, 291).

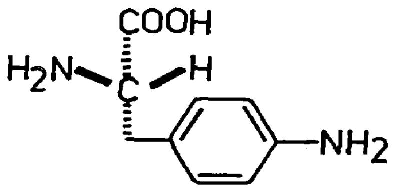
V. vexillata (L.) A. Rich.

Khasi - Jarmei-soh-lang-tor.

A new amino acid - L(+)p-aminophenylalanine - isolated from legume and characterised (*Phytochemistry* 1972, *11*, 2567).

Distribution : Native of tropical America; distributed nearly throughout the tropical part of India ascending to 2400 m in the Himalayas

NEW COMPOUNDS



p-Aminophenylalanine

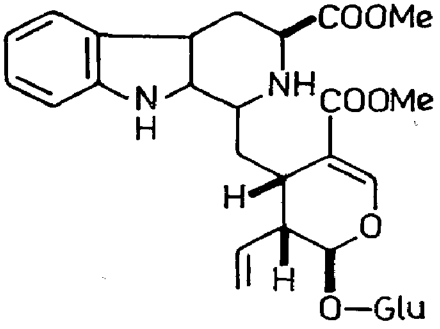
VINCA (Apocynaceae)

V. major L. var. *elegantissima* Hort.

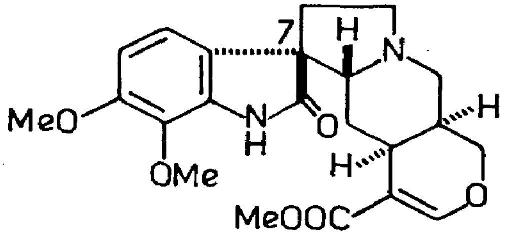
Oxindole alkaloids - elegantissine and isoelegantissine - isolated (*Experientia* 1975, *31*, 876); 5α-carbomethoxystrictosidine and its N(b)methyl analog isolated after methylation of glycosidic mixture (*Indian J. Chem.* 1976, *14*, 306).

Distribution : Nilgiri Hills.

NEW COMPOUNDS



5α-Carbomethoxystrictosidine



Elegantissine

Isoelegantissine(7-epimer)

V. pusilla Murr.; see *Catharanthus pusillus* (Murr.) G. Don

V. rosea L.; see *Catharanthus roseus* (L.) G. Don

VIOLA (Violaceae)

V. tricolor L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 430).

Structure of a flavone C-glycoside - violanthin - elucidated; isolation of vitexin, saponaretin, orientin, isoorientin and vicenin-2 (*Z. Naturforsch.* 1972, *27*B, 954; *Chem. Abstr.* 1973, *78*, 16440 q); synthesis of violanthin (*C. R. Acad. Sci.* Ser. C 1972, *275*, 1523; *Chem. Abstr.* 1973, *78*, 136594 q); structure of violanin established as delphinidin-3-[6''-O-α-L-(p-coumaroyl) rhamnosyl-D-glucoside]-5-D-glucoside (*Tetrahedron Lett.* 1978, 2413); saponin content determined (14.8%) (*Stud. Cercet. Biochim.* 1978, *21*, 89; *Chem. Abstr.* 1978, *89*, 176359 a).

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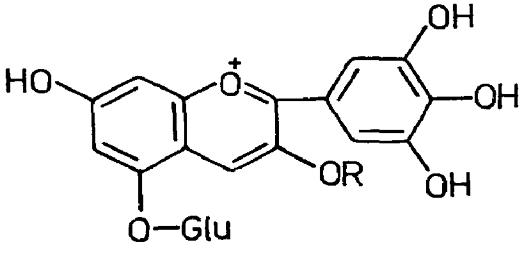
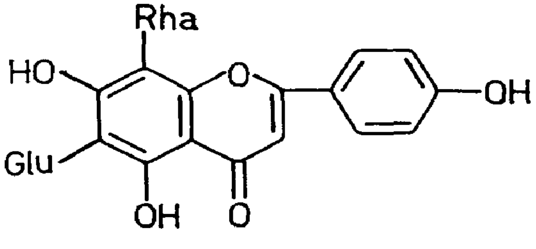


Violanin

R = Glu(6→1)Rha(4''-p-coumaroyl)



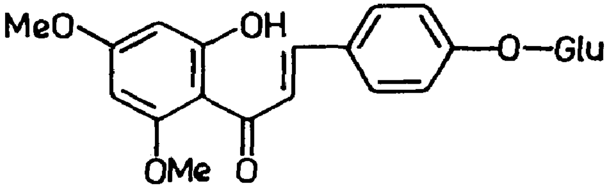
Violanthin

VISCUM (Loranthaceae)

V. album L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 430).

A new chalcone - 2'-hydroxy-4',6'-dimethoxychalcone-4-glucoside (I) - isolated and characterised (*Z. Naturforsch.* 1978, *33*, 771; *Chem. Abstr.* 1979, *90*, 51384 u).

NEW COMPOUNDS



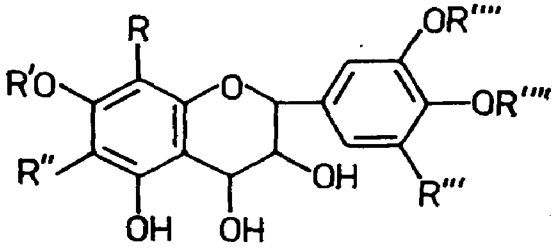
I

VITEX (Verbenaceae)

V. negundo L. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 256).

n-Tritriacontane, n-hentriacontane, n-pentatriacontane, n-nonacosane, *β*-sitosterol, p-hydroxybenzoic acid and 5-oxyisophthalic acid from seeds (*J. Indian Chem. Soc.* 1973, *50*, 367; *Indian J. Chem.* 1974, *12*, 226); 3,4-dihydroxybenzoic acid also isolated (*Indian J. Chem.* 1974, *12*, 226); vanillic and p-hydroxybenzoic acids and luteolin isolated from bark (*Indian J. Pharm.* 1977, *39*, 41); two new leucoanthocyanidins isolated from stem bark and their structures determined as 6,8-di-O-methylleucodelphinidin and 3',4'-di-O-methylleucocyanidin-7-O-rhamnoglucoside (*Indian J. Chem.* 1978, *16*B, 615).

NEW COMPOUNDS



6,8-di-O-Methylleucodelphinidin
R ,R'' = OMe, R',R'''' = H,R''' = OH
3',4'-di-O-Methylleucocyanidin-7-O-rhamnoglucoside
R,R'',R''' = H, R' = Glu(4→1)Rha, R'''' = Me

V. trifolia L. (*Compend. Indian Med. Plants,* Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 432).

Friedelin, *β*-sitosterol, its glucoside and a long chain hydrocarbon isolated from leaves (*Indian J. Pharm.* 1976, *38*, 13).

VITIS (Vitaceae)

V. glauca (Roxb.) W. & A.; see *Cissus glauca* Roxb.

V. quadrangularis Wall.; see *Cissus quadrangularis* L.

V. vinifera L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 432).

Determination of palmitic (19.0), stearic (4.0), oleic (18.0), linoleic (13.0) and linolenic (46.0%) acids in shoot extracts of var. *ugni blanc* (*C. R. Acad. Sci.* Ser. D 1973, *277*, 309; *Chem. Abstr.* 1974, *80*, 24798 u); quercetin-3-glucoside, (+)catechin, (-)epicatechin, (+)gallocatechin, procyanidins B_1 and B_2 isolated as peracetyl derivatives from var. *trebbiano*; oleanolic acid and β-sitosterol glucoside also obtained (*Ann. Chim.* 1976, *66*, 429; *Chem. Abstr.* 1977, *87*, 180693 f); isochlorogenic acid, an isomer of quercitrin and an isomer of rutin isolated from leaves; latter substances not characterised (*Tezisy Dokl. Soobsch.-Konf. Molodykh Uch. Mold.* 1975, 100; *Chem. Abstr.* 1976, *85*, 2512 x); a monoglycolipid containing a free amino group present in leaf (*Haryana Agric. Univ. J. Res.* 1977, *7*, 64; *Chem. Abstr.* 1979, *90*, 19041 u); cholesterol, β-sitosterol and ergosterol isolated from fruits (*Khim. Prir. Soedin.* 1978, *14*, 411; *Chem. Abstr.* 1978, *89*, 126168 s).

VITTADINA (Asteraceae)

V. australis A. Rich.

Hentriacontane, friedelin, epifriedelinol, stigmast-7,22-dien-3β-O-glucoside and a mixture of stigmast-7-enol and stigmast-7,22-dienol isolated (*Indian J. Chem.* 1975, *13*, 199).

Distribution : Native of Australia, naturalised in hills of India.

BIOLOGICAL ACTIVITY

Stigmast-7,22-dien-3β-O-glucoside showed diuretic activity in mice equivalent to chlorthiazide (*Indian J. Chem.* 1975, *13*, 199).

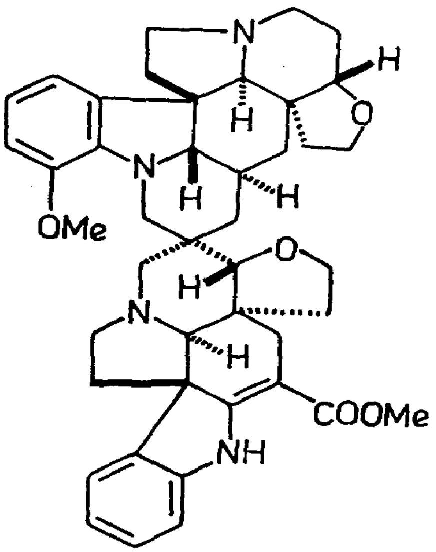
VOACANGA (Apocynaceae)

V. grandifolia (Miq.) Rolfe

Voacangine, vobtusine, vobtusine lactone and voacamine in addition to lupeol, lupeol acetate and β-sitosterol isolated from stem bark (*Indian J. Chem.* 1973, *11*, 1208); vobtusine, vobtusine lactone and deoxyvobtusine isolated from leaves; structure elucidation of deoxyvobtusine (*Phytochemistry* 1974, *13*, 1261); tabersonine, rhazine, vobtusine and lupeol acetate isolated from fruits (*J. Indian Chem. Soc.* 1974, *51*, 370).

Distribution : Introduced into India in Indian Botanic Garden, Howrah.

NEW COMPOUNDS



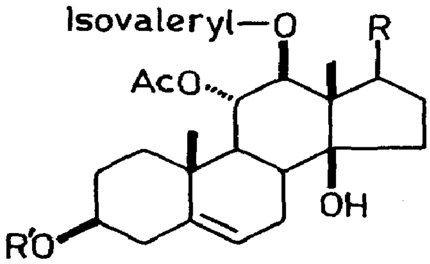
Deoxyvobtusine

WATTAKAKA (Asclepiadaceae)

W. volubilis (L.) Stapf syn. *Dregea volubilis* (L.f.) Benth. ex Hook.f. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 433).

A new glycoside - dregoside A - isolated along with drevogenin A and drebbysogenin G (*Chem. Pharm. Bull.* 1969, *17*, 2629).

NEW COMPOUNDS



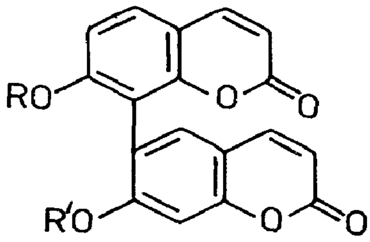
Dregoside A
R = COMe, R' = Cymarose
Drevogenin A
R = COMe, R' = H
Drebbysogenin G
R = CHMeOH, R' = H

WIKSTROEMIA (Thymelaeaceae)

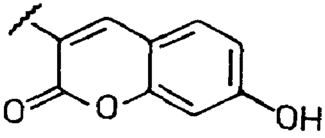
W. indica (L.) C.A. Mey. syn. *W. indica* (L.) C.A. Mey. var. *viridiflora* (Meissn.) Hook.f., *W. viridiflora* Meissn. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 258).

A new lignan - wikstromol - isolated along with arctigenin, matairesinol and pinoresinol (*Phytochemistry* 1976, *15*, 1789); a tricoumarin - wikstrosin - isolated along with daphnoretin and characterised (*Phytochemistry* 1977, *16*, 1991); a new lignan - (+)nortrachelogenin (wikstromol) - isolated along with daphnoretin; structure of former established (*J. Nat. Prod.* 1979, *42*, 159).

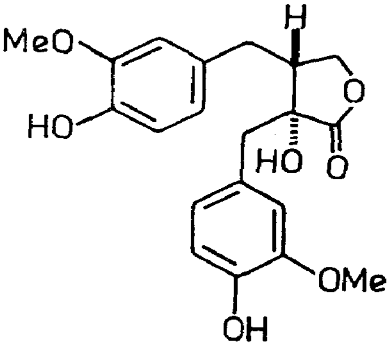
NEW COMPOUNDS



Wikstrosin

R(or R′) = 

R′(or R) = H



Wikstromol

BIOLOGICAL ACTIVITY

Nortrachelogenin showed CNS depressant activity in rabbits (*J. Nat. Prod.* 1979, *42*, 159).

W. indica (L.) C.A. Mey. var. *viridiflora* (Meissn.) Hook.f.; see *W. indica* (L.) C. A. Mey.

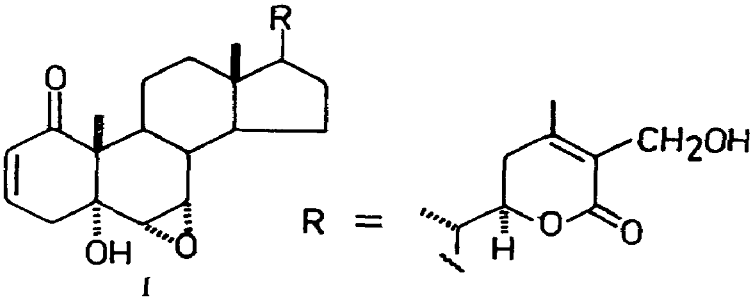
W. viridiflora Meissn.; see *W. indica* (L.) C.A. Mey.

WITHANIA (Solanaceae)

W. coagulans (Stocks.) Dunal (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 434).

A new steroid - 5,27-dihydroxy-6α,7α-epoxy-1-oxo-5α-witha-2,24-dienolide (I) - isolated along with withaniol and withaferin A (*Indian J. Pharm.* 1976, *38*, 22).

NEW COMPOUNDS



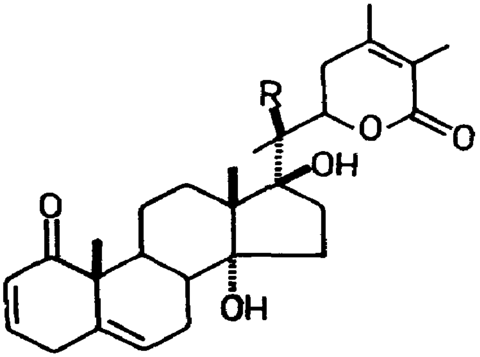
I

W. somnifera (L.) Dunal (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 434).

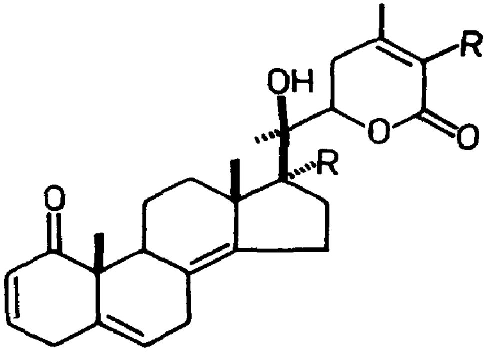
Alcoholic extract showed potentiation of barbiturate hypnosis and decreased locomotor activity in rats. It induced depletion of acetylcholine and catecholamines in brain and increased whole brain tissue levels of serotonin and histamine (*J. Res. Indian Med. Yoga & Homoeo.* 1979, *14*, 49).

A C-28 steroid lactone isolated from roots and identified as 5,20α-dihydroxy-6α,7α-epoxy-1-oxowitha-2,24-dienolide (withanolide) (*Planta Med.* 1973, *24*, 8); nine new steroidal lactones - withanolides E,F,G,H,I,J,K,L and M - isolated from leaves; seven of these characterised as 20-hydroxy-1-oxo-20R,22R-witha-2,5,8(14),24-tetraenolide (withanolide G), 20,27-dihydroxy-1-oxo-20R,22R-witha-2,5,8(14),24-tetraenolide (withanolide H), 20-hydroxy-1-oxo-20R,22R-witha-3,5,8(14),24-tetraenolide (withanolide I), 17,20-dihydroxy-1-oxo-20S,22R-witha-2,5,8(14),24-tetraenolide (withanolide J), 17,20-dihydroxy-1-oxo-20S,22R-witha-3,5,8(14),24-tetraenolide (withanolide K), 17,20-dihydroxy-1-oxo-20S,22R-witha-2,5,14,24-tetraenolide (withanolide L) and 17,20-dihydroxy-1-oxo-14,15α-epoxy-20S,22R-witha-2,5,24-trienolide (withanolide M) (*Tetrahedron* 1973, *29*, 1353); another withanolide - WS-1 - isolated from seeds (*Indian J. Chem.* 1976, *14*, 434); structures of withanolides E,F,P and S determined (*J. Chem. Soc.* Perkin 1 1977, 341).

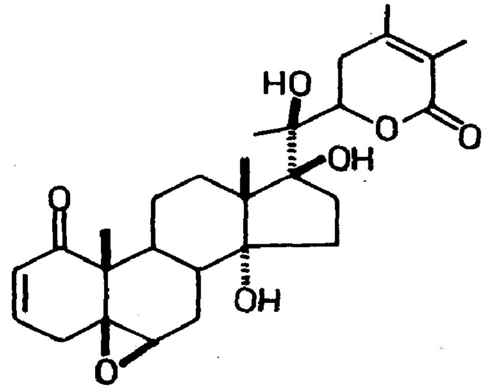
NEW COMPOUNDS



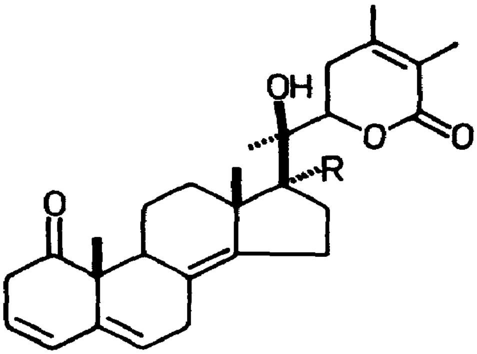
Withanolide F
R = OH
Withanolide P
R = H



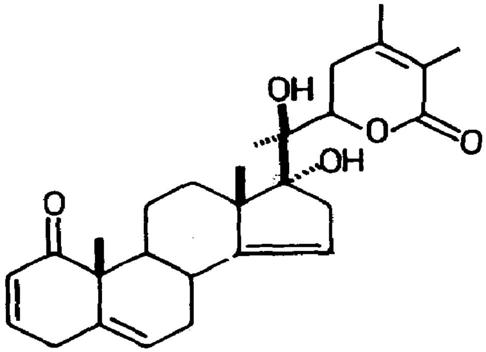
Withanolide G
R = H, R' = Me
Withanolide H
R = H, R' = CH_2OH
Withanolide J
R = OH, R' = Me



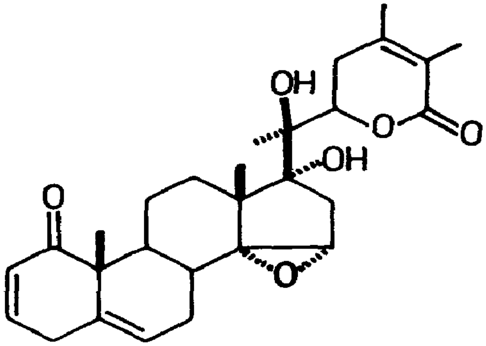
Withanolide E



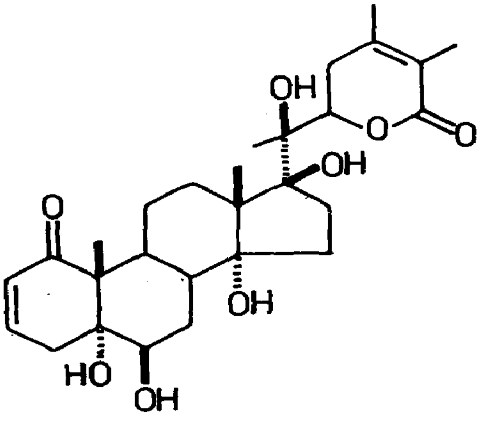
Withanolide I
R = H
Withanolide K
R = OH



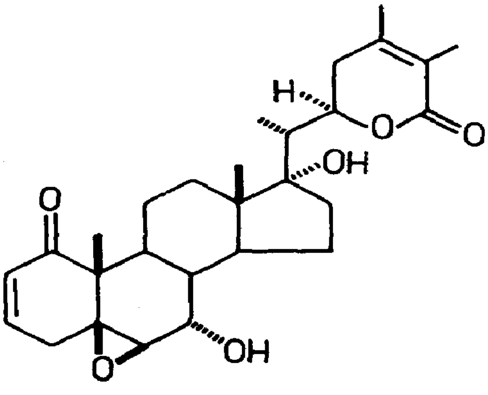
Withanolide L



Withanolide M



Withanolide S



Withanolide WS-I

BIOLOGICAL ACTIVITY

An alkaloid - visamine - prolonged hexanal-induced sleeping time and showed hypothermic and nicotinolytic effects in mice but had no effect in mice exposed to maximum electroshock or treated with arecoline or strychnine. LD50 values 450 mg/kg, s.c., and 125 mg/kg, i.p., in mice (*Tr. Vses. Nauch.-Issled. Inst. Lek. Rast.* 1971, *14*, 159; *Chem. Abstr.* 1973, *79*, 27315 z); withaferin A and withanolide E exhibited specific immunosuppressive effect on human B and T lymphocytes and on mice thymocytes. Withanolide E had specific effect on T lymphocytes whereas withaferin A affected both B and T lymphocytes (*Biomedicine* 1978, *28*, 18; *Chem. Abstr.* 1978, *89*, 70864 w).

WOODFORDIA (Lythraceae)

W. floribunda Salisb.; see *W. fruticosa* (L.) Kurz

W. fruticosa (L.) Kurz syn. *W. floribunda* Salisb., *Grislea tomentosa* Roxb. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 259).

Extract of flowers possessed significant abortifacient activity in mice (*Indian J. Med. Res.* 1975, *63*, 378).

Ellagic acid, polystachoside, myricetin-3-galactoside and pelargonidin-3,5-diglucoside isolated from leaves and flowers (*Indian J. Pharm.* 1976, *38*, 110); cyanidin-3,5-diglucoside isolated from flowers (*Proc. Nat. Acad. Sci.* India 1977, *47*A, 35; *Chem. Abstr.* 1978, *89*, 176338 t); octacosanol, β-sitosterol and chrysophanol-8-O-β-D-glucopyranoside isolated from flowers (*Planta Med.* 1979, *36*, 183).

WRIGHTIA (Apocynaceae)

W. arborea (Dennst.) Mabberley syn. *W. tomentosa* Roem. & Schult. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 259).

Conkurchine, conessine, conessidine, holarrhine and kurchine isolated (*Indian J. Pharm.* 1977, *39*, 37).

W. tomentosa Roem. & Schult.; see *W. arborea* (Dennst.) Mabberley

XANTHIUM (Asteraceae)

X. spinosum L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 436).

A sesquiterpene lactone - xanthatin - isolated (*Khim. Prir. Soedin.* 1973, *9*, 559; *Chem. Abstr.* 1974, *80*, 45621 w).

X. strumarium L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 437).

d-Limonene, d-carveol, terpinolene, β-caryophyllene, p-cymene and α-pinene from essential oil (*Flavour Ind.* 1970, *1*, 627; *Chem. Abstr.* 1970, *73*, 133929 p); xanthinin and choline isolated (*Planta Med.* 1974, *26*, 75); xanthumin isolated from leaves (*J. Indian Chem. Soc.* 1975,

52, 1224); xanthinin (1.0), two triterpene alcohols, mp. 211° (0.16%) and mp. 274° and choline (0.15%) isolated (*J. Drug Res.* 1975, *7*, 161; *Chem. Abstr.* 1977, *87*, 98837 x); lipid fraction of plant composed of C_{27}-C_{33} n-alkanes and C_{28}-C_{32} n-alkanols; unsaponifiable fraction consisted of C_{23}-C_{35} n-alkanes and C_{22}-C_{30} n-alkanols besides a mixture of β-sitosterol, stigmasterol and campesterol (*Trans. Ill. State Acad. Sci.* 1976, *69*, 310; *Chem. Abstr.* 1977, *87*, 197348 v); carboxyatractyloside isolated and characterised (*Phytochemistry* 1976, *15*, 1178); isohexacosane, chlorobutanol, stearyl alcohol, β-sitosterol and palmitic acid isolated from leaves (*J. Indian Chem. Soc.* 1977, *54*, 797); strumasterol, oleic acid, 3,4-dihydroxycinnamic acid, β-sitosterol-D-glucoside and KCl isolated from leaves (*J. Indian Chem. Soc.* 1978, *55*, 707); heptacosanol, stigmasterol, β-sitosterol and its glucoside, 3,4-dihydroxycinnamic acid, KCl, KNO_3, and K_2SO_4 isolated from roots and stems (*J. Indian Chem. Soc.* 1979, *56*, 108).

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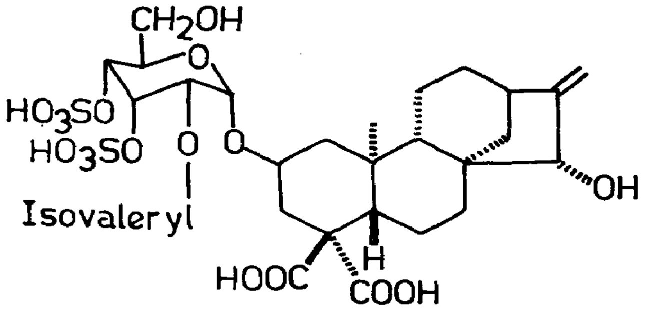


Carboxytractyloside

BIOLOGICAL ACTIVITY

Xanthumin showed antibacterial activity (*J. Indian Chem. Soc.* 1975, *52*, 1224); carboxyatractyloside possessed hypoglycaemic activity (*Phytochemistry* 1976, *15*, 1178).

XEROMPHIS (Rubiaceae)

X. spinosa (Thunb.) Keay syn. *Randia dumetorum* Lamk.

Six saponins - dumetoronins A,B,C,D,E and F - isolated, all of them contained oleanolic acid as aglycone (*J. Indian Chem. Soc.* 1978, *55*, 397).

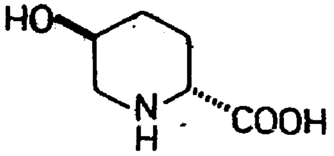
XYLIA (Mimosaceae)

X. dolabriformis Benth.; see *X. xylocarpa* (Roxb.) Taub.

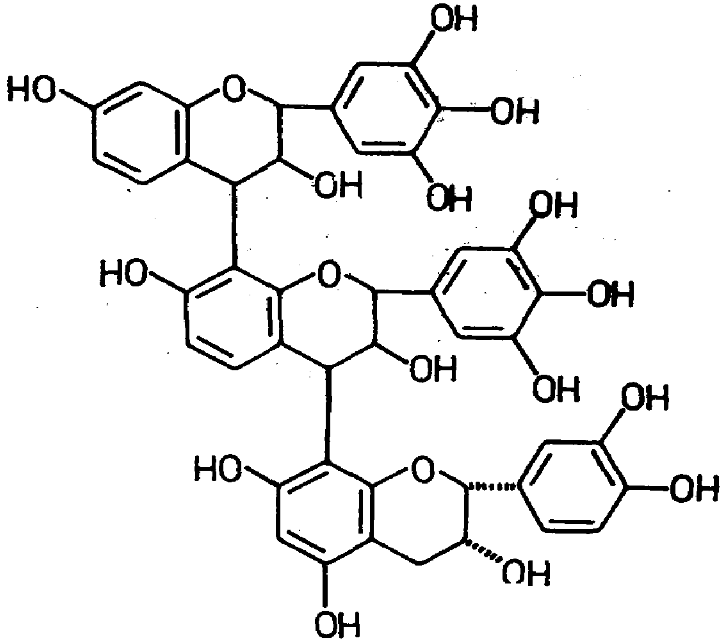
X. xylocarpa (Roxb.) Taub. syn. *X. dolabriformis* Benth. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 438).

A trimeric proanthocyanidin - dolabriproanthocyanidin - isolated and shown to possess two successive robinetinidin units linked to (-)epicatechin, interflavanoyl linkages being 4,8 or 4,6 (*Indian J. Chem.* 1976, *14*B, 654); trans-5-hydroxypipecolic acid isolated from leaves and characterised (*Planta Med.* 1979, *35*, 339).

NEW COMPOUNDS



Trans-5-hydroxypipecolic acid



Dolabriproanthocyanidin

BIOLOGICAL ACTIVITY

Trans-5-hydroxypipecolic acid (0.1 mM) totally inhibited blood platelet aggregation induced by serotonin (0.1 mM) (*Planta Med.* 1979, *35*, 339).

XYLOCARPUS (Meliaceae)

X. granatum Koen. syn. *Carapa granatum* (Koen.) Alston, *C. moluccensis* auct. (non Lamk.) p.p., *C. obovata* Blume (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 51).

Bark contained friedelin, β-sitosterol, stigmasterol, methyl 3β-isopropyl-1-oxomeliacate, methyl 3β-acetoxy-1-oxomeliacate and triacontanol whereas leaves contained friedelin and a mixture of two unidentified tetranortriterpenoids (*J. Indian Chem.* Soc. 1976, *53*, 947).

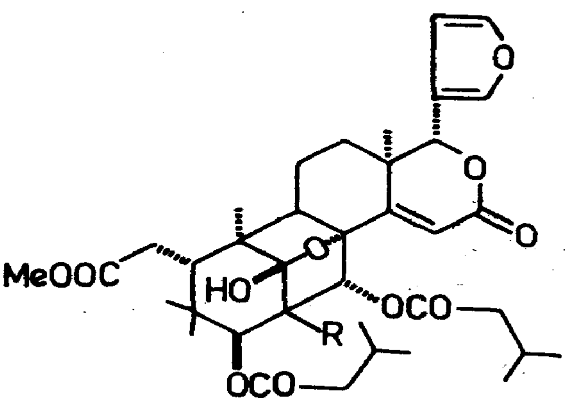
X. moluccensis (Lamk.) Roem. syn. *Carapa moluccensis* sensu Hiern (non Lamk.) p.p.

H. - Pussur; B. - Dhundul; Tam. - Kandalangay.

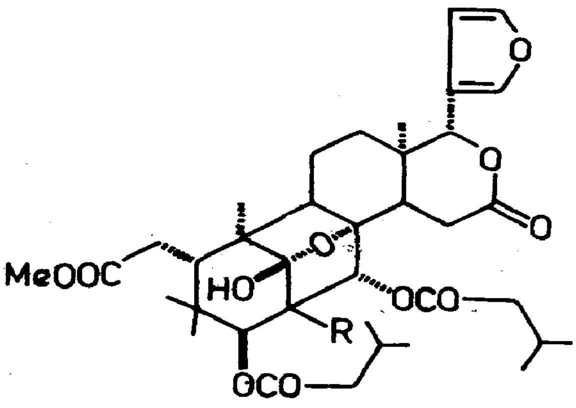
Limonoids - xyloccensins A,B,C,D,E and F - and methyl angolensate isolated from seeds; structures of xyloccensins A, B, D and F elucidated; xyloccensin E was identical to phragmalin triacetate (*J. Chem. Soc.* Perkin 1 1976, 1993).

Distribution : Coastal regions of India and Andaman Islands.

NEW COMPOUNDS



Xyloccensin A
R = H
Xyloccensis D
R = OH



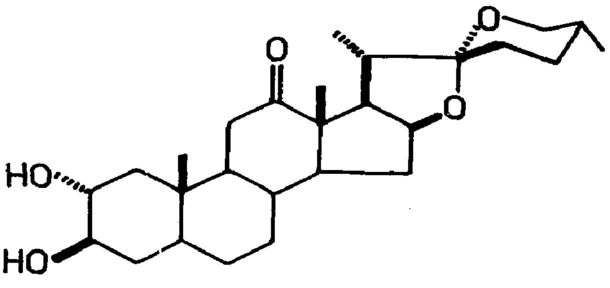
Xyloccensin B
R = H
Xyloccensin F
R = OH

YUCCA (Liliaceae)

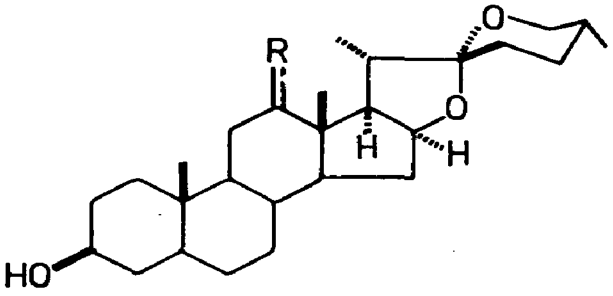
Y. gloriosa L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 439).

Gloriogenin (25R-5β-spirostan-3β-ol-12-one) and 12β-hydroxysmilagenin (25R-5β-spirostan-3β,12β,diol) isolated along with β-sitosterol, smilagenin, tigogenin, hecogenin, rockogenin and gitogenin (*An. Quim.* 1972, *68*, 309; *Chem. Abstr.* 1972, *77*, 126925 p); leaves yielded tigogenin, 25D-5α-spirostan-3β-ol, 25D-5α-spirostan-3β,6α-diol and chlorogenin (*Planta Med.* 1971, *19*, 87); α-pinene, β-pinene, camphene, p-menthene, limonene, p-cymene, terpinolene, α-copaene, γ-gurjunene, aromadendrene, α-muurolene, γ-muurolene, γ-cadinene, δ-cadinene, n-heptadecane, cis-8-heptadecene, n-nonadecane, cis-9-nonadecene, 1-hexanol, 3-hexen-1-ol, 3-octanol, 1-octen-3-ol, linalool, α-terpineol and citronellol detected in essential oil of flowers (*Nippon Nogei Kagaku Kaishi* 1977, *51*, 649; *Chem. Abstr.* 1978, *88*, 78945 y); gitogenin, manogenin, tigogenin and hecogenin isolated from leaves (*Hua Hsueh Hsueh Pao* 1978, *36*, 149; *Chem. Abstr.* 1978, *89*, 176353 u).

NEW COMPOUNDS



Manogenin



Gloriogenin
R = O
12β-Hydroxysmilagenin
R = α-H,β-OH

ZAMIA (Cycadaceae)

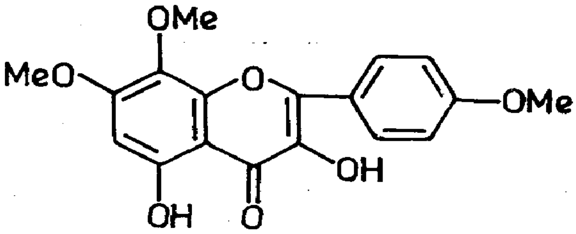
Z. angustifolia Jacq.

Amentoflavone, 4',4''',7,7''-tetra-O-methylamentoflavone, bilobetin, ginkgetin, sciadopitysin and sequoiaflavone isolated from leaves (*Phytochemistry* 1971, *10*, 436).
Distribution : Native of tropical and subtropical America, introduced into Indian gardens.

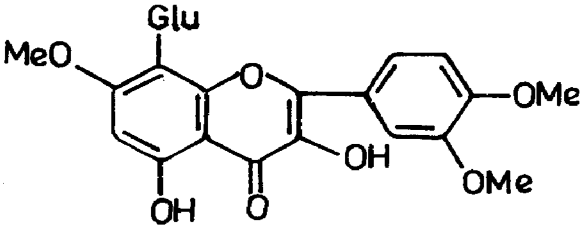
ZANTHOXYLUM (Rutaceae)

Z. acanthopodium DC. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 260).

Detection of α-pinene (0.1), cumene (0.2), limonene (0.2), phellandrene (12.0), 2-heptanol (2.5), p-cymene (1.6), linalool (60.0), decylaldehyde (3.5), geranyl acetate (2.5), neryl acetate (1.0), geraniol (4.2), α-selenene (2.2) and citral (2.0%) in essential oil by GC (*Parfuem. Kosmet.* 1973, *54*, 270; *Chem. Abstr.* 1974, *80*, 30597 u); (+)sesamin, racemic methyl pluviatilol (fargesin) and (+)pinoresinol dimethyl ether isolated from stem bark (*Curr. Sci.* 1975, *44*, 288); tambulin (3,5-dihydroxy-7,8,4'-trimethoxyflavone) and tambulol (glucosyl-7,4'-dimethyl ether of gossypetin) isolated from fruits (*Indian J. Chem.* 1976, *14*B, 233); β-amyrin, β-amyrenone and an unidentified lignan isolated (*Curr. Sci.* 1976, *45*, 739); sesamin, eudesmin, epieudesmin and syringaresinol isolated (*Indian J. Chem.* 1977, *15*B, 95).
NEW COMPOUNDS



Tambulin



Tambulol

Z. alatum Roxb.; see *Z. armatum* DC.

Z. armatum DC. syn. *Z. alatum* Roxb. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 439).

Four lignans - sesamin, fargesin, eudesmin, epieudesmin-, three furoquinoline alkaloids - dictamnine, 8-hydroxydictamine and fagarin - along with a lactone - pluviatide - isolated (*Indian J. Chem.* 1977, *15*B, 95).

Z. budrunga Wall. ex DC.; see *Z. rhetsa* (Roxb.) DC.

Z. limonella (Dennst.) Alston; see *Z. rhetsa* (Roxb.) DC.

Z. ovalifolium Wight syn. *Z. ovalifolium* Wight var. *sepiarium* (Wight) Hook.f. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 260).

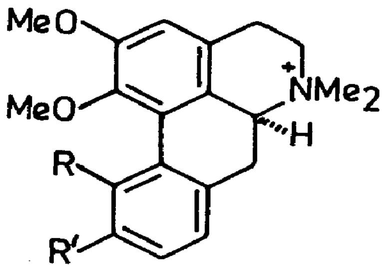
Canthin-6-one, aurapten, isopimpinellin, β-amyrin and sitosterol isolated from root bark and stem bark (*Phytochemistry* 1973, *12*, 729).

Z. ovalifolium Wight var. *sepiarium* (Wight) Hook.f.; see *Z. ovalifolium* Wight

Z. oxyphyllum Edgew. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 439).

Sesamin, eudesmin, epieudesmin, syringaresinol, γ-fagarine, β-sitosterol and lupeol isolated (*Indian J. Chem.* 1977, *15*B, 95); zanthoxyphylline isolated along with corydine from root bark and its structure determined (*Phytochemistry* 1978, *17*, 1068); a new alkaloid - zanoxyline - isolated from stem bark, its structure determined and confirmed by partial synthesis from coclaurine (*Phytochemistry* 1979, *18*, 517).

NEW COMPOUNDS



Zanthoxyphylline
R = OMe, R′ = H
Zanoxyline
R = H, R′ = OMe

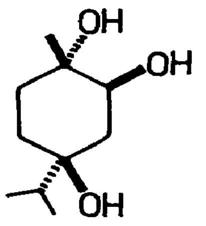
Z. rheta (Roxb.) DC. syn. *Z. budrunga* (Roxb.) DC., *Z. limonella* (Dennst.) Alston (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 440).

Essential oil from fruits showed maximum local anaesthetic activity at 0.02% by infiltration and corneal application in guinea pigs, but it lacked surface anaesthetic activity. It produced

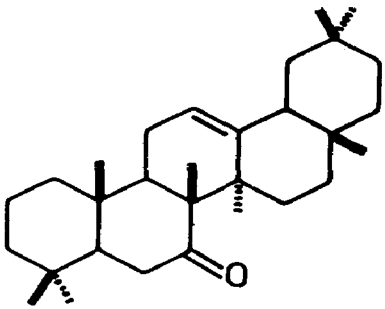
some irritation when given intradermally or instilled in eye in 5% concentration. LD50 value in mice more than 1.0 g/kg, i.p. (*Indian J. Med. Res.* 1972, *60*, 757).

A new triterpene ketone - xanthoxylone - isolated and characterised (*Phytochemistry* 1974, *13*, 623); a new monoterpene triol isolated and its structure determined as (1S,2S,4S)-trihydroxy-p-menthane (*Phytochemsitry* 1976, *15*, 1568).

NEW COMPOUNDS



(1S,2S,4S)-Trihydroxy-p-menthane



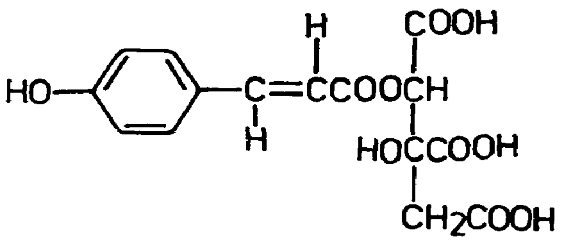
Zanthoxylone

ZEA (Poaceae)

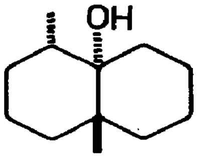
Z. mays L. (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 440).

β-Sitosterol from oil (*Egypt. J. Chem.* 1974, *17*, 873; *Chem. Abstr.* 1977, *86*, 95976 k); di-O-(indole-3-acetyl)-myo-inositol and tri-O-(indole-3-acetyl)-myo-inositol isolated from kernels (*Carbohydr. Res.* 1974, *36*, 1; *Chem. Abstr.* 1974, *81*, 166392 b); three new substituted cinnamoyl hydroxycitric acids isolated and characterised as 2-O-trans-p-coumaroyl-(2S,3S)-hydroxycitric acid (I), 2-O-trans-feruloyl-(2S,3S)-hydroxycitric acid (II) and 2-O-trans-caffeoyl-(2S,3S)-hydroxycitric acid (III) (*Agric. Biol. Chem.* 1977, *41*, 359; *Chem. Abstr.* 1977, *86*, 136340 u); sixty one volatile compounds identified by GC-MS with 2-heptanol as major constituent; a highly odorous compound - geosmin - also obtained (*J. Agric. Food Chem.* 1978, *26*, 1290; *Chem. Abstr.* 1978, *89*, 176294 a); cyanidin-*β*-glucoside isolated (*Agric. Biol. Chem.* 1979, *43*, 389; *Chem. Abstr.* 1979, *90*, 164745 f).

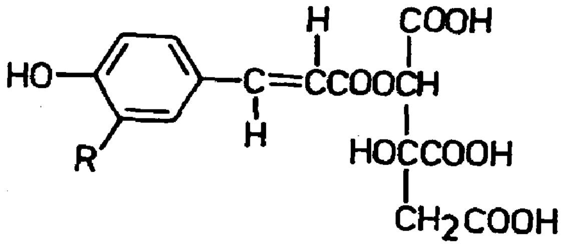
NEW COMPOUNDS



I



Geosmin



II
R = OMe
III
R = OH

BIOLOGICAL ACTIVITY

Estrogenic potency of β-sitosterol one-tenth that of estradiol monobenzoate (*Egypt. J. Chem.* 1974, *17*, 873; *Chem. Abstr.* 1977, *86*, 95976 k).

ZEHNERIA (Cucurbitaceae)

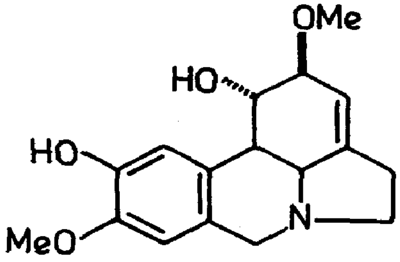
Z. umbellata (Klein. ex Willd.) Thw.; see *Solena amplexicaulis* (Lamk.) Gandhi

Z. umbellata (Klein. ex Willd.) Thw. var. *nepalensis* (Ser.) Clarke; see *Solena amplexicaulis* (Lamk.) Gandhi

ZEPHYRANTHES (Amaryllidaceae)

Z. carinata Herb.

A new phenolic base - carinatine - isolated and characterised as O-demethylgalanthine; pretazettine, lycorine and galanthine also isolated (*Chem. Pharm. Bull.* 1977, *25*, 2244).
Distribution : Grown in Indian gardens as ornamental.
NEW COMPOUNDS



Carinatine

Z. robusta Baker (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 440).

Maritidine isolated from bulbs (*Curr. Sci.* 1979, *48*, 110).

Z. sulphurea Hort.

Eng. - Zephyr-flower, Thunder-flower.

Maritidine isolated from bulbs (*Curr. Sci.* 1979, *48*, 110).

Distribution : Native of America; grown in Indian gardens

ZINGIBER (Zingiberaceae)

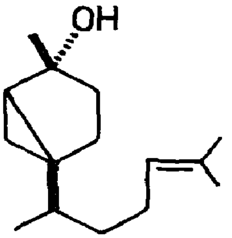
Z. cassumunar Roxb.; see *Z. purpureum* Rosc.

Z. officinale Rosc. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 261).

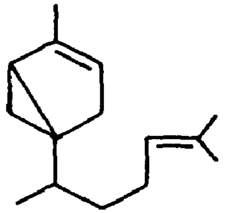
Ginger oleoresin when administered orally significantly lowered serum and hepatic cholesterol and increased faecal cholesterol excretion (*Nutr. Rep. Int.* 1978, *17*, 183; *Chem. Abstr.* 1978, *88*, 182818 v).

Detection of heptane, octane, isovaleraldehyde, nonanol, ethyl pinene, camphene, β-pinene, sabinene, myrecene, limonene, β-phellandrene and 1,8-cineole in essential oil by GLC (*Phytochemistry* 1972, *11*, 3377); presence of gingediol, methylgingediol and their diacetates by GC-MS (*Yakugaku Zasshi* 1974, *94*, 735; *Chem. Abstr.* 1974, *81*, 166345 p); new sesquiterpenes - sequithujene, cis-sesquisabinene hydrate and zingiberenol (2-methyl-6(trans-4'-methyl-4'-hydroxycyclohex-2'-enyl)-hept-2-ene) - isolated and their structures determined (*Can. J. Chem.* 1975, *53*, 3285); car-3-ene, α-terpinene, α-terpineol, nerol, 1,8-cineole, zingiberene, neral, geranial, geraniol and geranyl acetate identified in essential oil from rhizomes (*Nippon Nogei Kagaku Kaishi* 1978, *52*, 207; *Chem. Abstr.* 1978, *89*, 152563 m).

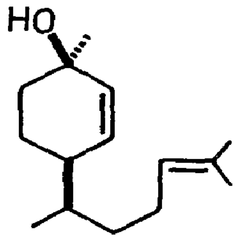
NEW COMPOUNDS



Cis-sesquisabinene hydrate



Sesquithujene

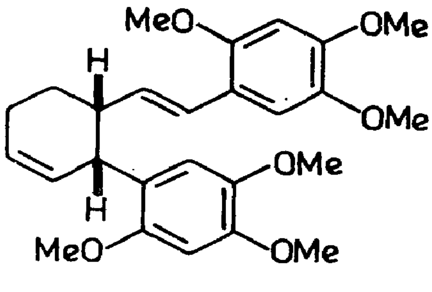


Zingiberenol

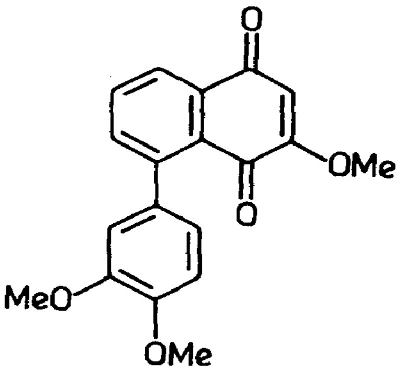
Z. purpureum Rosc. syn. *Z. cassumunar* Roxb. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 261).

Crystal structures of two new aromatic compounds - cis-3-(2',4',5'-trimethoxyphenyl)-4-[(E)-2''',4''',5'''-trimethoxystyryl]cyclohex-1-ene (I) and 8-(3',4'-dimethoxyphenyl)-2-methoxynaphtho-1,4-quinone (II) - isolated from rhizomes; cis-3-(3',4'-dimethoxystyryl)-4-[(E)-3''',4'''-dimethoxy styryl]cyclohex-1-ene, cis-3-(3',4'-dimethoxyphenyl)-4-[(E)-2''',4''',5'''-trimethoxystyryl]cyclohex-1-ene, (E)-4-(3',4'-dimethoxyphenyl)-but-3-en-1-ol and (E)-4-(3',4'-dimethoxyphenyl)- but-3-en-1-yl acetate also isolated (*Aust. J. Chem.* 1979, *32*, 71).

NEW COMPOUNDS



I

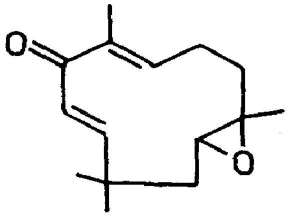


II

Z. zerumbet (L.) Smith (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 441).

A new sesquiterpene epoxy ketone - zerumbone oxide - isolated and its structure elucidated (*Indian J. Chem.* 1975, *13*, 222).

NEW COMPOUNDS



Zerumbone oxide

ZIZYPHUS (Rhamnaceae)

Z. jujuba Lamk.; see *Z. mauritiana* Lamk.

Z. jujuba Mill. syn. *Z. sativa* Gaertn. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 262).

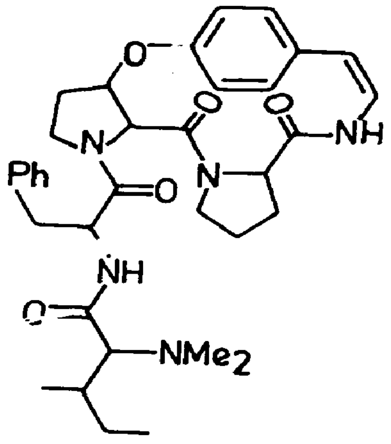
Stepharine, N-nornuciferine and asimilobine isolated from fruits (*Pakistan J. Sci. Res.* 1978, *30*, 81; *Chem. Abstr.* 1979, *90*, 83640 r).

Z. mauritiana Lamk. syn. *Z. jujuba* Lamk. (non Mill.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 442).

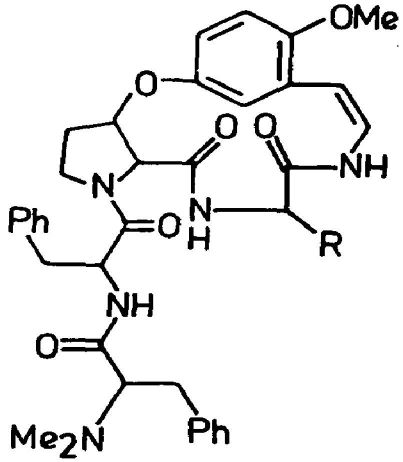
Two peptide alkaloids - mauritines A and B - isolated and their structures elucidated (*Tetrahedron Lett.* 1972, 2609); unsaturated C_{18} acid found as main fatty acid of seed oil along with β-sitosterol (*Tokyo Gakugei Daigaku Kiyo. Dai-4-Bu* 1973, *25*, 94; *Chem. Abstr.* 1974, *80*, 24803 s); four new peptide alkaloids - mauritines C,D,E and F - isolated in addition to mauritines A and B, frangufoline and amphibines B,D and F (*Ann. Chem.* 1974, 1694);

structure elucidation of two new cyclopeptide alkaloids - jubanines A and B - isolated along with mauritine A, mucronine D, amphibine H and nummularines A and B (*Phytochemistry* 1976, *15*, 541); new alkaloids hysodricanine A and mauritine H isolated from bark and their structures elucidated (*Phytochemistry* 1977, *16*, 1025); two new alkaloids - yuziphine and yuzirin - isolated from leaves and characterised as (R)1-(4′-hydroxybenzyl)-7-methoxy-8-hydroxytetrahydroisoquinoline and 1-(4′-hydroxybenzyl)-6-methoxy-7-hydroxyisoquinoline respectively; in addition coclaurine, isoboldine, norisoboldine and asimilobine isolated (*Khim. Prir. Soedin.* 1977, *13*, 239; *Chem. Abstr.* 1977, *87*, 114612 c); betulonic acid, lupeol, β-sitosterol and its acetate and betulin isolated from stems (*Proc. Nat. Acad. Sci.* India 1978, *48*A, 6; *Chem. Abstr.* 1979, *90*, 118114 b); saponins - jujubosides A and B - isolated from seeds and their structures determined (*Phytochemistry* 1978, *17*, 1349); three new alphitolic acid p-coumarates (I,II and III) isolated from fruits along with betulinic and alphitolic acids and characterised (*Chem. Pharm. Bull.* 1978, *26*, 1798); a dammarane saponin - jujuboside B_1 - isolated from seeds and its structure elucidated (*J. Chem. Res.* (S) 1978, 144; *Chem. Abstr.* 1979, *90*, 23579 t); new p-coumaroylates of maslinic acid - 3-O-trans-p-coumaroyl- and 3-O-cis-p-coumaroyl maslinic acids - isolated from fruits together with betulonic, oleanonic and maslinic acids as their methyl esters (*Chem. Pharm. Bull.* 1978, *26*, 3075).

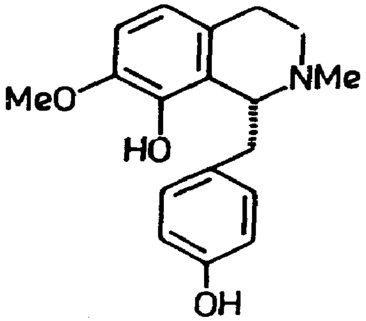
NEW COMPOUNDS



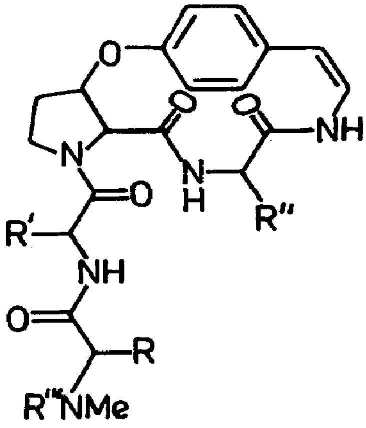
Hysodricanine A



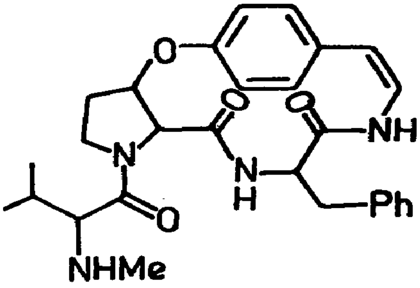
Jubanine A
R = CHMeEt
Jubanine B
R = CH_2Ph



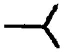
Yuziphine



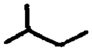
Mauritine A



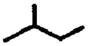
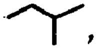
Mauritine C

R,R''' = Me, R' =  ,R'' = CH_2Ph

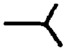
Mauritine B

R =  , R' = ,R'' = CH_2Ph, R''' = Me

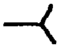
Mauritine D

R,R'' =  , R' = , R''' = Me

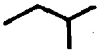
Mauritine E

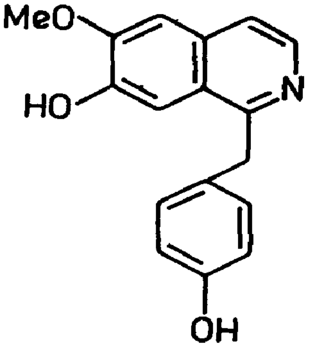
R,R''' = Me, R' =  ,R'' = CH(OH)Ph

Mauritine F

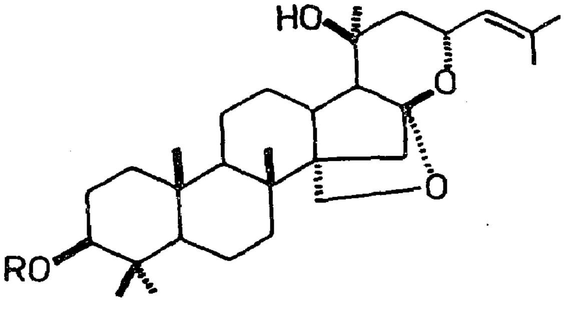
R = Me, R' =  , R'' = CH_2Ph, R''' = H

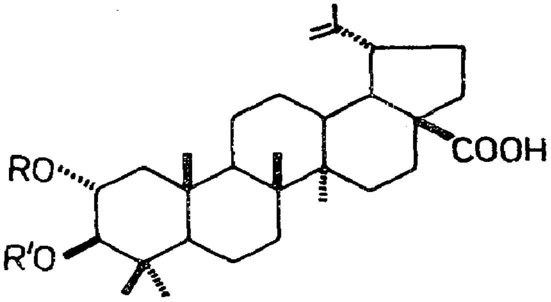
Mauritine H

R,R''' = Me, R' =  ,R'' = CH_2Ph



Yuzirin





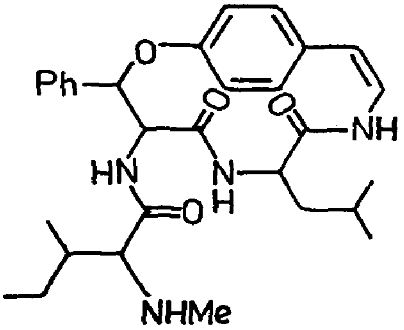
Jujuboside B_1
R = Ara[(2→1)Fuc](3→1)Glu(2→1)Xyl
Jujuboside A
R = Ara[(2→1)Rha](3→1)Glu[(2→1)Xyl](6→1)Glu
Jujuboside B
R = Xyl[(2→1)Rha](3→1)Glu(2→1)Ara

I
R = H, R′ = coumaroyl(trans)
II
R = coumaroyl, R′ = H
III
R = H, R′ = coumaroyl(cis)

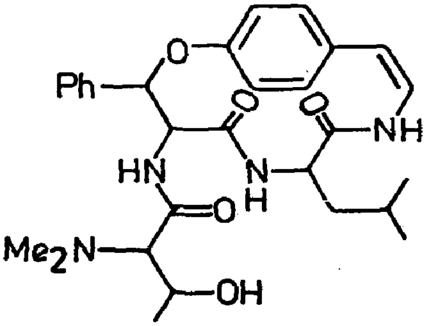
Z. nummularia (Burm.f.) W. & A. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 261).

New cyclopeptide alkaloids - nummularines D,E and F - isolated from root bark together with frangufoline, amphibine A, integerrenine and mauritine F (*Tetrahedron* 1975, *31*, 2944); peptide alkaloids - nummularines G,H and K isolated from bark and their structures determined (*Chem. Ber.* 1977, *110*, 2649); taxifolin-3-O-β-D-glucoside isolated along with taxifolin and manogenin and characterised (*Planta Med.* 1977, *32*, 384).

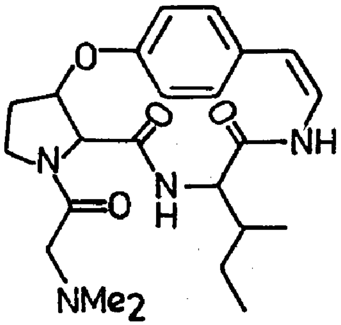
NEW COMPOUNDS



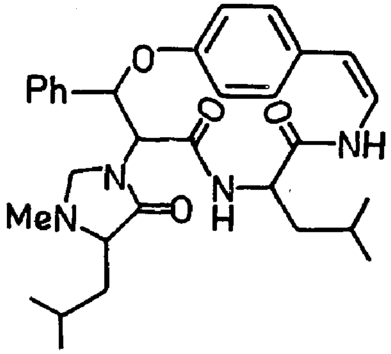
Nummularine D



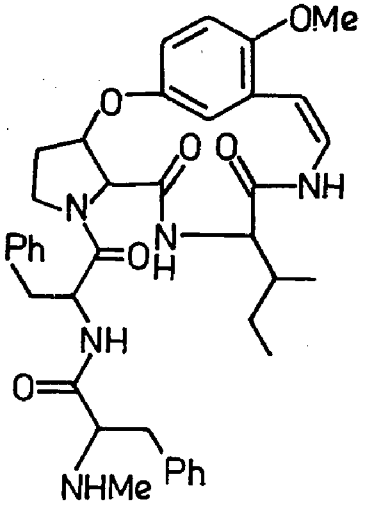
Nummularine E



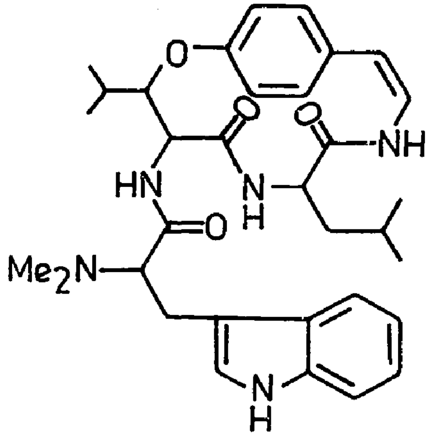
Nummularine F



Nummularine G



Nummularine H

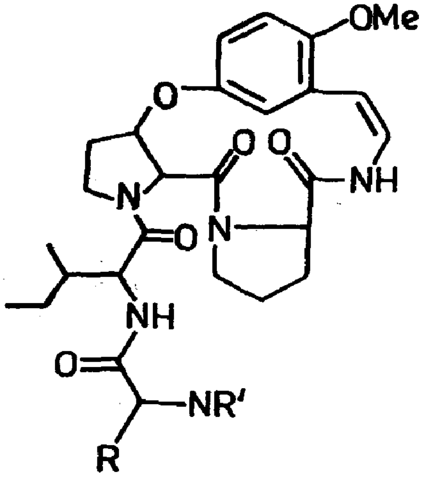


Nummularine K

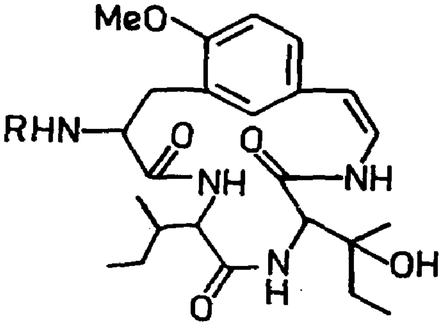
Z. oenoplia (L.) Mill. (*Glossary Indian Med. Plants,* Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 261).

Structure of peptide alkaloid - zizyphinine - elucidated (*Monatsh. Chem.* 1969, *100*, 1608; *Chem. Abstr.* 1970, 72, 13037 d); structure of zizyphine A, a peptide alkaloid from bark (*Tetrahedron Lett.* 1973, 2577); zizyphines C,D and E isolated from stem bark along with zizyphines A and B and abyssinines A and B (*Tetrahedron* 1974, *30*, 2461).

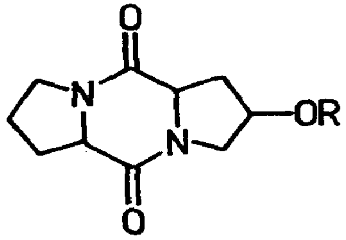
NEW COMPOUNDS



Zizyphine A
R = CH(Me)CH_2Me, R' = Me_2
Zizyphine B
R = CH(Me) CH_2Me, R' = H_2
Zizyphine C
R = CH_2Ph, R' = Me_2



Zizyphine D
R = Me
Zizyphine E
R = H



Zizyphinine

CHMeEt
R = C_6H_3[CH = CHNHCOCHNHCOCHCHMeEt][(OMe)-3,4]
NHMe

Z. rugosa Lamk. (*Glossary Indian Med. Plants*, Chopra, Nayar & Chopra, PID, New Delhi, 1956, p. 262).

A new glycoside - zizyphoside - isolated along with betulic, oleanolic, alphitolic and 2α-hydroxyursolic acids; zizyphoside on hydrolysis yielded altered aglycone, ebelin lactone (*Indian J. Chem.* 1972, *10*, 152).

Z. sativa Gaertn.; see *Z. jujuba* Mill.

ZYGOPHYLLUM (Zygophyllaceae)

Z. coccineum L.; see *Z. propinquum* Decne.

Z. propinquum Decne. syn. *Z. coccineum* auct. (non L.) (*Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990, p. 442).

Aqueous extract caused lowering of blood pressure and showed diuretic, antipyretic, local anaesthetic and antihistaminic activities (*Bull. Fac. Pharm.*, Cairo Univ. 1967, *6*, 245; *Chem. Abstr.* 1970, *73*, 75231 s).

Zygophyllin and quinovic acid showed anti-inflammatory, choleretic and antipyretic activities and protected adrenalectomised mice against histamine. Zygophyllin produced slight elevation of blood pressure in dog and smooth muscle contraction. LD50 of zygophyllin in toads 142.6/600 mg, s.c.; in mice 41.11 mg/100g, i.p. LD50 of quinovic acid in toads 82.5 mg/100g and in mice 17.71 mg/100g (*Bull. Fac. Pharm.*, Cairo Univ. 1967, *6*, 253; *Chem. Abstr.* 1970, *73*, 75345 g).

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Abreviations used : B.-Bengal; Bo.-Bombay; Eng.-English; Guj.- Gujarat; H.-Hindi; Kan.-Kanarese; Kash.-Kashmir; Mal.-Malayam; Mar.-Maharashtra; Nep.-Nepal; P.-Punjab; S.-Sanskrit; Tam.-Tamil; Tel.-Telugu.

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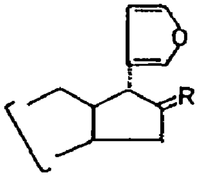
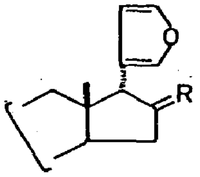
2	16	W.& A. (non Willd.)	W. & A.
25	10	Polijakav	Polijakov
43	1	Schul.	Schult.
67	6	*guinguegona*	*quinquegona*
70	6	1′-acetoxl′-hydroxy-1′-methylpentyl	1′-acetoxy-4′-hydroxy-4′-methylpentyl
73	Str. name	I	Qinghaosu
76	12,13	...*grata* Wall., *A. roxburghiana*...	...*grata* Wall., *A. roxburghiana*...
83	16	ATLANTIA	ATALANTIA
93	24	Spring	Spreng.
96	5	*B. neriifolia* (Moon)	*B. neriifolia* Moon
104	2	*malabarica* Schott	*malabarica* (DC.) Schott
158	9	7,2′,3-trihydroxy	7,2′,3′-trihydroxy
159	Str. canthedulin-8	R = OH	R = H
190	2	Clavicipilaceae	Clavicipitaceae
206	17	*ambiqua*	*ambigua*
215	6	*bininnatus*	*bipinnatus*
216	8,25	CONTINUS, *oxycantha*	COTINUS, *oxyacantha*
216	9	*coggygria, continus*	*coggyria, cotinus*
225	4	131	132
229	18	*Hokobu*	*Hokoku*
230	16	Masam.	Masam. ex Sauer.
236	14	2,3-dihydromentoflavone	2,3-dihydroamentoflavone
238	22	*D. giganteum*	*C. giganteum*
274	2	Makino Nemoto	Makino & Nemoto
275	13	Bakh.	Bakh.f.
282	27	*D. volubilis* Benth. *Wattakaka volubilis* (L.) Stapf	*D. volubilis* (L.f.) Benth. *Wattakaka volubilis* (L.f.) Stapf
287	2	DYXOXYLUM	DYSOXYLUM
293	2	*tesjerium*	*tsjerium*
296	6	*saman* Prain	*saman* (Jacq.) Prain ex king
299	33	*altacium*	*altaicum*
301	2,3	*crysta-galli*, erytrinine	*crista-galli*, erythrinine
307	14	*samarangese*	*samarangense*
315	33	*Ipomea*	*Ipomoea*
316	6,7	...(non L.) *F. arabica*	...(non L.), *F. arabica*

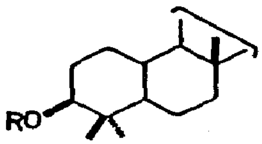
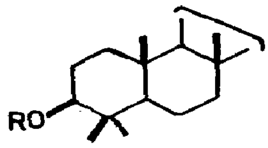
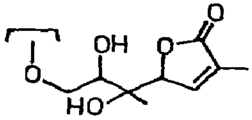
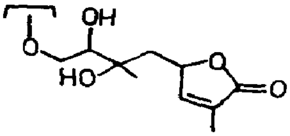
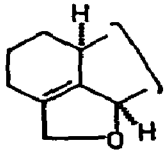
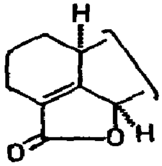
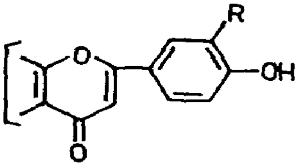
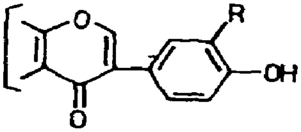
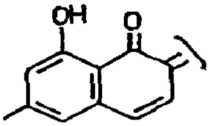
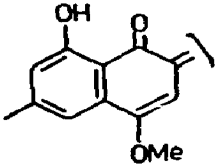
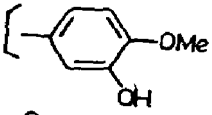
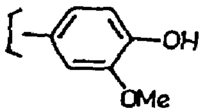
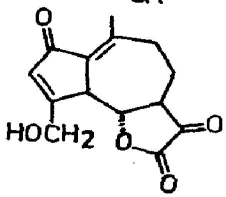
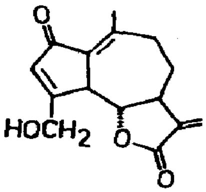
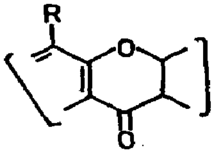
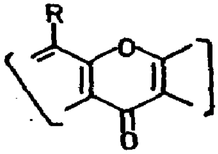
329	11	ssp. *vaillantii* Loisel.	*ssp. vaillantii* (Loisel.) Hook.f.
332	2	*tetrahit*	*tetrahit* L.
338	22	*G. chirayita* Roxb.	*G. chirayita* Roxb. ex Flem.
342	20	1956	1990
344	3	(Jacq.) Walp.	(Jacq.) Kunth ex Walp.
350,351	5,2,3	L.	(L.) Hillard & Burtt
352	5	(Wall. ex Mett.)	(Wall. ex Mett.) J. Sm.
366	6,12	*thomsoni*, alkaloid	*thomsonii*, coumarin
368	16	Pennell	Wettst.
369	5	Hook.f.	Hook.
370	23	hentacontane	pentacontane
379	11	*pentardra* (Buch.-Ham.) Oker	*pentandra* (Buch.-Ham.) Oken
381	18	Urba	Urban
391	8	Astin	Austin
400	10	*prostata*	*prostrata*
406	8	*anamalayanum*	*anamallayanum*
411	1	*nepetaiefolia*	*nepetaefolia*
412	3,8	*cardaria draba* L., *Restit.*	*Cardaria draba* (L.) Desv., *Rastit.*
415	23	Wt. & Arn.	L.
417	30	*Mokuzal*	*Mokuzai*
422	5	*zeylanica* C. & T. Nees	*zeylanica* Nees
441	Str. names	Phenylamammea A Phenylammea B	Phenylmammea A Phenylmammea B
453	12	(non sensu Hook.f.)	non Hook.f.
461	2	MELLETTIA	MILLETTIA
465	21	Benth. Hook.	Benth. & Hook.
482	18,19	...*chinensis* Lam., *L. glutinosa...*	...*chinensis* Lam., *L. glutinosa...*
484	5	*Euphorbia*	*Euphoria*
496	1	*sqarrosa*	*squarrosa*
496,554	20,31	1956	1990
497	22	*auriculata*	*auricularia*
504	15	*Cernum*	*Cernuum*
520	9	*calomelanes*	*calomelanos*
530	3	Hook.f.	Hook.f.p.p.
536	Str. Picroside I	R,R' = H	R,R'' = H
537	3	*P. ovalifolia* D.Don	*P. ovalifolia* (Wall.) D. Don
538	6	*betel*	*betle*
547	18	*alatum* (Wt. & Arn.)	*alatum* (Wall. ex Wt. & Arn.)
557	21	*Kokoku*	*Hokoku*
588	21,22	..*Aschers.*, *N. officinale......*	..*Aschers.*, *N. officinale.......*
599	6	*cilare*	*ciliare*
603	6	Engl.	Endl.
614	8	*cilata*	*ciliata*
625	22,23	L.F., *L. rhombifolia*	L.f., *S. rhombifolia*
640	Str. name	24-Dehydroobtusifoliol	24-dihydroobtusifoliol
647	11	Sterculaceae	Sterculiaceae

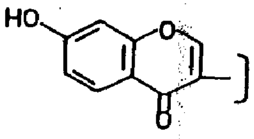
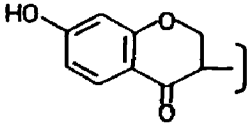
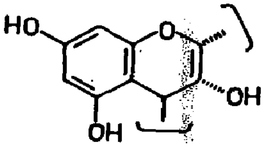
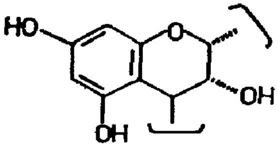
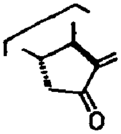
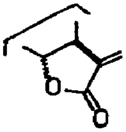
664	3	*fructiculosa*	*fruticulosa*
665	11	1900	1990
669	14	auct.[non(L.)Pers.]	sensu Baker. p.p. [non (L.) Pers]
677	5	*Shirtsu*	*Shiritsu*
685	13	Voight	Voigt
705	1	Wall.	Wall. ex W. & A.
706	3	*volubilis* (L.) Stapf	*volubilis* (L.f.) Stapf
715	7,22	Wall. ex D.C., *rheta*	(Roxb.)D.C., *rehetsa*
718	13, 16	myrecene, sequithujene	myrcene, sesquithujene
791	32,33,34	468	435

14	Add bet. lines 8 & 9 - *A. viscosum* Forst.; see *A. lavenia* (L.) O. Kuntze
62	Line 1, delete - (I)
62	Add bet. lines 14 & 15 - *A. quinquefolia* Decne. & Planch; see *Pnax ginseng* C.A. Mey
73	Line 8, delete - (I)
118	Add bet. lines 1 & 2 - *C. indicus* Spreng.; see *C. cajan* (L.) Millsp.
217	Line 22, add after Thoms. - var. *nurvala* (Buch.-Ham.) Hook. f. & Thoms.
335	Add bet. lines 9 & 10 - Distribution; Western Ghats.
466	Add bet. line 15 & 16- *M. lotoides* (L.) Kuntze; see *Glinus lotoides* L.
473	Add as line 1 - *M. suberosa* Benth.; see *M. sericea* (Willd.) A. Cheval
477	Add bet. lines 2 & 3 - *M. attenuata* Hook. f. & Thoms.; see *Knema attenuata* (Hook. f. & Thoms.) Warb,.
530	Add bet. lines 11 & 12 - *P. niruri* Hook. f.; see *P. fraternus* Webster
599	Add as line 1 - *R. graveolens* L. var. *angustifolia* Hook. f.; see *R. chalepensis* L.
647	Add bet. lines 14 & 15 - *S. colorata* Roxb.; see *Firmiana colorata* (Roxb.) R.Br.
677	Line 4, add after Steud. - *Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990,p. 413)
711	Line 17, add after Lamk.- *Compend. Indian Med. Plants*, Vol. 1, Rastogi & Mehrotra, PID, New Delhi, 1990,p. 437)
328	Delete line 9
372	Delete line 14
562	Delete line 10
564	Delete line 12

CORRECTIONS IN STRUCTURES

PAGE	NAME	FOR	READ
40	II	$[-CH_2-(C\equiv)_2-CH=]$	$[-CH_2-(C\equiv C)_2-CH=]$
89	Azadirone, Azadiradione		

114	V		
170	Polyacetylene III	[—CH≡CH2	[—CH=CH2
189	Indicolactonediol		
225	Teucvidin		
243	I	MeOOC—C—C(Me)=]	MeOOC—CH2—C(Me)=]
247	8C-*Glucosyl* prunetin, Dalpanitin, Paniculatin		
275	Diosindigo A		
369	Herpetal, Herpetotriol		
403	8-Deoxylactucin		
471	Rubraflavones A, B, C		

477	I, II		
627	IV	$CH_2{=}CH(C{\equiv}C)CH-$]	$CH_2{=}CH(C{\equiv}C)_4CH-$]
643	*Proanthocyanidin*		
680	Tirotundin